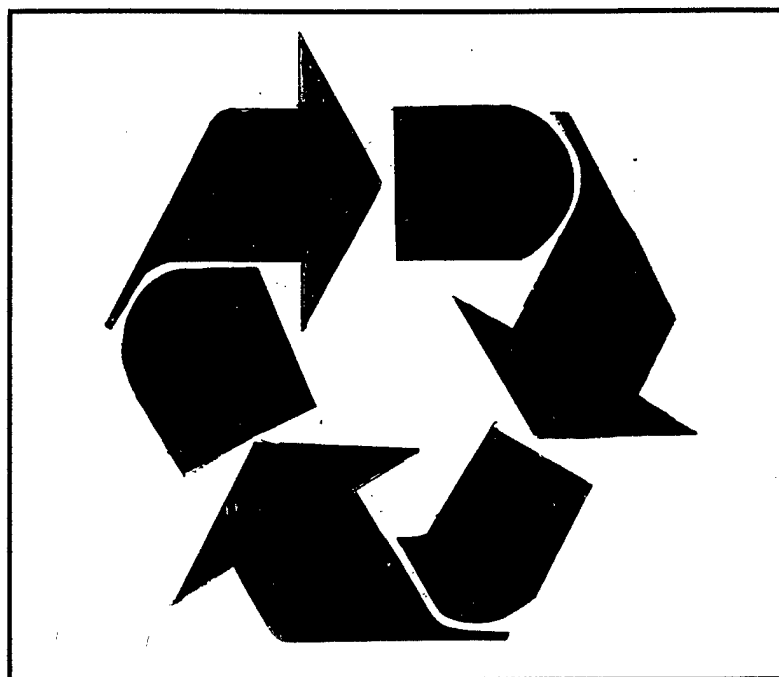

**Otter Brook Lake, New Hampshire
Connecticut River Basin, Flood Control Project**

Solid Waste Management Plan

RECYCLE CONSERVE RESOURCES



September 1996



**US Army Corps
of Engineers**
New England Division

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There are a number of federal, state, and local laws and regulations relating to solid waste management. This plan provides guidance to establish policies, and responsibilities, procedures, and instructions for proper handling, storage, disposal and recycling of solid waste generated at the flood control project. Solid wastes include petroleum, oil and lubricants (POLs), hazardous waste, paper, beverage containers, woody debris, and various other wastes.

This plan was developed from a literature search and review of federal, state, and local requirements and existing and anticipated waste streams. This plan is not a complete treatise on environmental laws and regulations. It is a list of solid waste regulations, policies, and references that may apply to the flood control project and a codification of existing and enhanced procedures for solid waste management.

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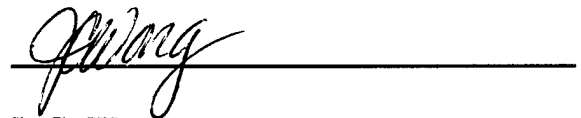
CONNECTICUT RIVER BASIN

Prepared By:
Planning Directorate
for
Operations Directorate

Approved by:



R. Bruce Williams
Division Environmental
Compliance Coordinator



J. C. Wong
Director of Operations

September 1996

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASSACHUSETTS 02254

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GENERAL

1-1 Introduction

This Solid Waste Management Plan includes, hazardous waste, petroleum, oil, and lubricants, and recycling strategies for the Otter Brook Lake Flood Control Project located in Keene and Roxbury, New Hampshire.

1-2 Purpose

This plan provides guidance to establish policies, responsibilities, procedures, and instructions for proper handling, storage, disposal and recycling of all solid wastes generated at the project. Solid wastes include petroleum, oil and lubricants (POL), hazardous waste, paper, beverage containers, woody debris, and miscellaneous wastes.

The plan was developed from a literature search and review of federal, state, and local requirements and existing and anticipated waste streams. This plan is not a complete treatise on environmental laws and regulations. It is a list of solid waste regulations, policies, and references that may apply to the flood control project and a collection of codifications pertaining to existing and enhanced procedures for solid waste management.

1-3 Flood Control Project Description

The Otter Brook project is located in the Monadnock region of southern New Hampshire on Otter Brook, a tributary of the Ashuelot River in the city of Keene, New Hampshire. (See Figure 1.) The project, built and operated by the Corps of Engineers, is used for flood control and recreation.

Its primary purpose is to provide flood protection for the community of Keene, New Hampshire, and secondly, to reduce flood stage at other downstream communities on the Ashuelot and Connecticut Rivers. The project is 1 of 7 flood control reservoirs in the Upper Connecticut River Basin.

The Otter Brook Lake project consists of a rolled earth dam, chute spillway, outlet

works, storage for flood control, and facilities for recreational purposes. The dam is 1,288 feet long and has a maximum height of 133 feet. The top width of the dam is 25 feet and accommodates an 18-foot paved access road. The spillway is located in a rock cut at the west end of the dam abutment. The crest length is 145 feet and the crest elevation is 781 feet national geodetic vertical datum (NGVD). The dam has the capacity to store 18,320 acre-feet of water during flood control operations.

The outlet works consist of a gate chamber, control tower, and operating house on the upstream side of the dam. A 6-foot discharge tunnel passes through the foundation and empties into Otter Brook at the downstream toe of the dam. Flow through the outlet gates is controlled by three hydraulically operated slide gates. There is a log boom located upstream of the dam to catch any debris which might foul the outlet works.

Also a permanent concrete weir containing five stop logs is located upstream of the dam center gate and this allows for the maintenance of a recreation pool behind the dam at 703 feet NGVD (about 870 acre-feet of water).

Otter Brook Lake provides a variety of recreation opportunities. There is a day-use area located on the lake which includes picnic tables, fireplaces, swimming beach, boat launch, rest rooms, change house and several parking lots. Water-based activities include boating (no gas motors), fishing, and swimming. Land-based activities include picnicking, ball playing, cross-country skiing, hiking, trails for horse riding and mountain bike riding, snow mobiling, hunting and trapping.

1-4 Overview of Solid Waste Generation

Facilities at the project that are potential waste generators or waste storage areas include the project office, several storage buildings, vehicles, control building (gate house) at the dam, log boom, recreation areas (swimming beach/picnic area and boat launch) and project lands where illegal dumping of trash occurs.

There are no active on-site landfills¹. The burial of solid waste is not permitted.

¹ There is a closed landfill at Otter Brook Lake. The landfill was closed in 1991. This landfill was used for disposal of non-hazardous solid waste.

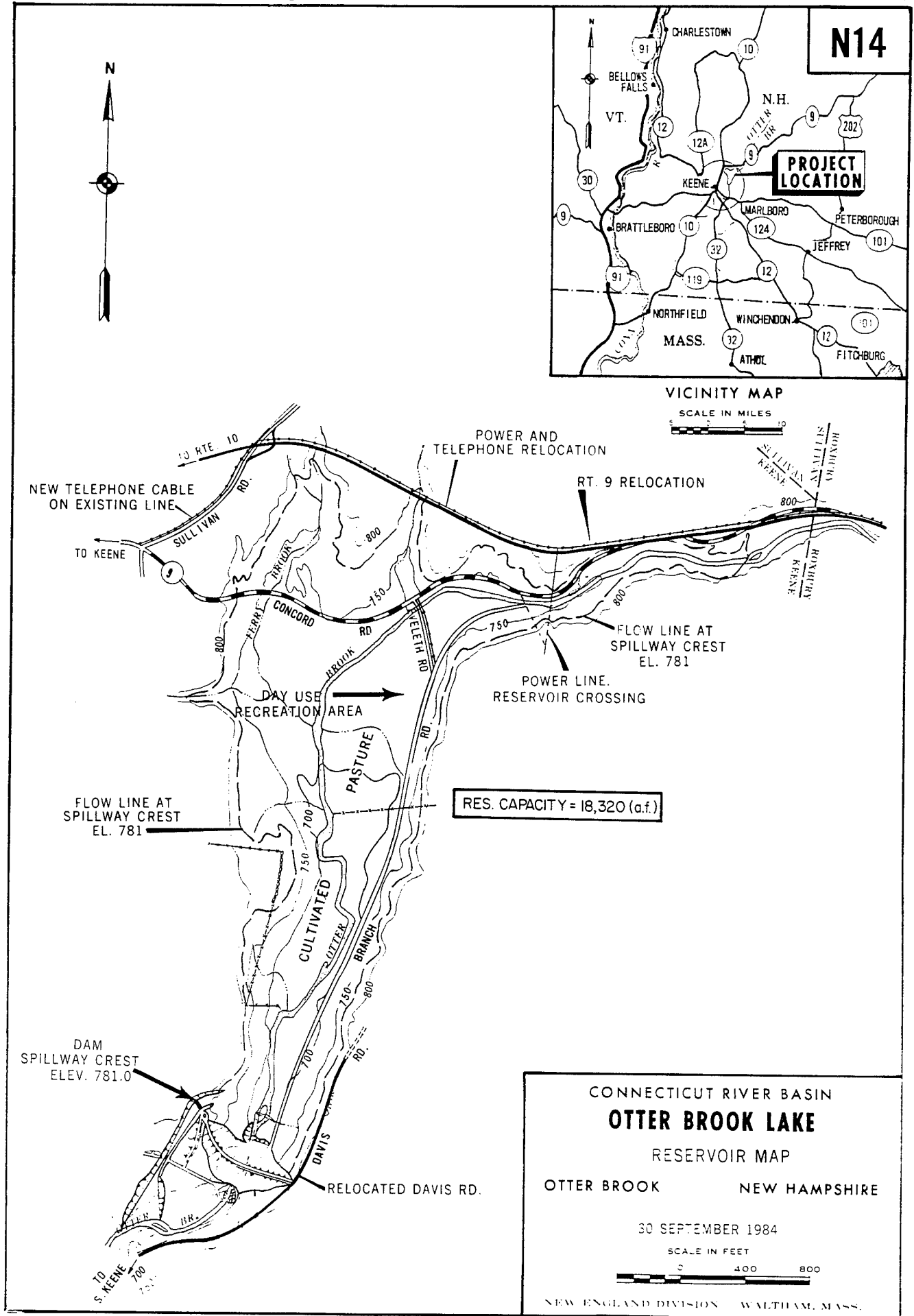


FIGURE 1

Except for a very small amount of yard waste or woody debris, which may be burned on site², virtually all solid waste generated in the project is carried out under the provisions of maintenance and disposal contracts. Non-hazardous recyclable materials are brought to the local recycling center by project staff. A carry in/carry out policy has been implemented at the recreation areas. Consumptive maintenance activities, such as service or project vehicles, are usually conducted off-site by a licensed service station. Minimal hazardous wastes are generated at the project.

² The project manager is planning to discontinue use of burning as a disposal method. In order to burn on-site appropriate approvals must be obtained from the local authorities.

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LAWS, REGULATIONS, and DIRECTIVES

2-1 Federal

The following is a list of pertinent Federal Statutes and Regulations, Executive Orders, Department of Defense Directives, Department of the Army Regulations and Corps of Engineer Regulations. This list should be updated periodically as laws and regulations are modified and reviewed by legal counsel, as appropriate, to determine the completeness and applicability of the list.

Statutes

Resource Conservation and Recovery Act (RCRA) of 1976, PL 94-580, as amended
 Subtitle C - Hazardous Waste Management
 Subtitle D - State or Regional Solid Waste Management Plans

Toxic Substance Control Act (TSCA) of 1976, Public Law 94-469, as amended.

Federal Facilities Compliance Act (FFCA) of 1992, P.L. 102-386.

Code of Federal Regulations

U.S. Department of Transportation (DOT) Hazardous Materials Regulations including Registration of Persons Who offer for Transport Hazardous Materials (Title 49 CFR, Part 107) Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements (Title 49 CFR, Part 172, 173) Segregation and Separation Chart of Hazardous Materials (Title 49 CFR, Part 177), and Packaging Standards (Title 49 CFR, Part 178).

U.S. Environmental Protection Agency (EPA) Protection of the Environment, Hazardous Waste Management Regulations (Title 40 CFR, 260-266).

U.S. Environmental Protection Agency (EPA) Protection of the Environment, Solid Waste Management Regulations (Title 40 CFR, 240-258).

Department of Defense Directives

DoD 4160.21-M, Defense Utilization and Disposal Manual, September 1982, as amended.

DoD Directive Number 4165.60, Solid Waste Management, dated 4 Oct 74.

Department of the Army Regulations

AR 200-1, Environmental Protection and Enhancement, 23 April 1990, Chapter 5 (Hazardous Material Management Program) and Chapter 6 (Solid Waste and Hazardous Waste Management Program).³

AR 420-47, Solid and Hazardous Waste Management, 1 December 1984.

Executive Orders

Executive Order 12088, Federal Compliance with Pollution Standards

Executive Order 12780, Federal Agency Recycling and the Council of Federal Recycling and Procurement Policy, Nov 4, 1991.

Executive Order 12873, Federal Acquisition, Recycling, and Waste Prevention, Oct 22, 1993.

Executive Order 12843, Procurement Requirements and Policies for Federal Agencies for Ozone Depleting Substances, April 21, 1993.

Executive Order 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, August 3, 1993.

³ Army Regulation 200-1. Applicability. This regulation does not apply to those civil works activities under the jurisdiction of the Secretary of the Army and implemented by the U. S. Army Corps of Engineers. However, it is anticipated that in the future a Corps Engineering Regulation similar to this regulation will be published.

Executive Order 12902, Energy Efficiency and Water Conservation at Federal Facilities, March 8, 1994.

Memoranda

Memorandum, CECC-ZA, dated 30 October 1992, Subject: Federal Facilities Compliance Act (FFCA).

Memorandum, CECW-OA, dated 24 Nov 1992, Subject: USACE Facilities Environmental Compliance Letter No. 1, Solid Waste Recycling.

Memorandum, CECW-OA, dated 25 August 1993, Subject: Hazardous Waste Manifest Policy and Procedures.

Memorandum, CEMP-CP, dated 4 May 1995, Subject Hazardous Waste Manifest Signature Policy and Procedures.

Memorandum, CECW-OA, dated 22 February 1995, USACE Facilities Environmental Compliance Guidance Letter No. 2, Federal Facilities Compliance Act (FFCA) of 1992, Fines and Penalties at Civil Works Funded Projects, Facilities and Activities.

Reports

USACERL Special Report - EC 95/05, dated Nov 94, titled "Environmental Assessment and Management Team Guide" (ERGO)

USACERL Special Report - EC 95/07, dated Nov 94, titled "Environmental Review Guide for Operations" (ERGO), "Supplement for the Environmental Assessment and Management Team Guide".

2-2 State of New Hampshire

The Federal government sets minimum national standards for solid waste disposal. The State of New Hampshire may impose more stringent measures and procedures than the federal regulations. The following is a list of pertinent State of New Hampshire Statutes, Regulations, and Reports.

General Laws

New Hampshire Statutes, Title X, Public Health, Chapter 147-A, Hazardous Waste Management.

New Hampshire Statutes, Title X, Public Health, Chapter 149-M, Solid Waste Management.

New Hampshire Code of Administrative Rules

Hazardous Waste Rules ENV-WM 100-1000

Management of Certain Waste Rules ENV-WM 2600

2-3 Local

The City of Keene, New Hampshire has a Solid Waste Disposal Ordinance and a Recycle Ordinance. (See Appendix A.) The city currently operates a landfill, but may be going to a transfer station in the future. The city also operates a recycling center. The local ordinance requires source separation of recyclables.

2-4 Applicability

Federal Facilities Compliance Act of 1992. (P.L.- 102-386) This act provides for a waiver of sovereign immunity with respect to federal, state, and local procedural and substantive requirements relating to RCRA solid and hazardous waste laws and regulations.

Additionally in its passage of the Act, Congress clearly intended to subject Federal facilities to penalties and fines arising from violation of these laws.

Federal Recycling Requirements. (40 CFR 246.200-1 and 246.202-1, DoD 4165.60, Executive Order 12873, CECW-OA-memorandum-24-November-92.) According to direction provided in these regulations, Corps facilities are required to participate in any state or local recycling program and reduce the volume of waste materials at the source whenever practical. Facilities with over 100 office workers are required to recover high grade paper. Agencies are also required to set goals for increasing the procurement of recycled and environmentally preferable products.

New Hampshire Regulations. RCRA, like most federal environmental legislation, encourages states to develop and run their own solid waste program. The state program must be as least as stringent as the EPA program. New Hampshire has been authorized by EPA to run their own solid waste program.

The state solid waste management laws are contained in Chapter 149-M Solid Waste Management. Section 149-M:22 addresses refuse recycling and reduction. In brief summary this section requires the removal of recyclable material from refuse to be disposed of at a private solid waste landfill facility having a lining and a leachate collection system or requires that the refuse be reduced in weight by at least 20 percent. Removal of recyclables is not required if the waste is brought to an incinerator.⁴ Persons who transport refuse to a public solid waste landfill facility, which is not lined and does not have a leachate collection facility, may be required by the town to pay an additional tipping fee to establish a closure fund for the landfill. In addition to state requirements, towns may have their own local ordinances regarding waste disposal and recycling.

Also Section 149-M:22 states that no leaf or yard waste shall be disposed of in a solid waste landfill or incinerator including any waste to energy facility.

⁴ This rule is currently under revision by the New Hampshire Legislature. The new rule will likely change the 20 percent reduction requirement at privately owned lined landfill with a leachate collection system to a 40 percent weight reduction goal to be achieved by everyone. The goal of weight reduction in the solid waste stream is to be achieved through source reduction, recycling and reuse, and composting.

The state hazardous waste management laws are contained in Chapter 147-A. The Hazardous Waste Rules are included in ENV-WM 100-1000. General information on the state program is included in Appendix C. These rules regulate the "cradle to grave" disposal of hazardous waste in New Hampshire.

2-5 Suggested Policy Guidelines

Suggested policy guidelines for management of solid wastes including POL waste liquid and hazardous waste are as follows:

- a. The quantity of solid waste should be reduced at the source whenever possible.
- b. Appropriate components of the waste stream should be recycled or composted to the fullest extent possible.
- c. Non-hazardous and non-toxic materials should be substituted for hazardous and toxic materials used in facility and activity operations and procedures, when practicable.
- d. Waste should be handled, stored, and disposed of in a manner which protects the health and welfare of all persons.
- e. Storage and disposal of POL should be carried out by the method(s) most advantageous to the government, in compliance with Federal, state, local, DoD and Army requirements.
- f. Hazardous waste should be safely controlled, accounted for with an audit trail and chain of custody, and handled in accordance with legal requirements.
- g. This project should not establish or maintain a landfill.
- h. To the extent possible, environmentally friendly products and products made from recycled materials should be purchased for use at the project.

WASTE DEFINITIONS ⁵

3-1 Solid Waste

Solid waste includes garbage, refuse, and sludge as well as any solid, semi-solid, liquid, or contained gaseous material that is discarded. A discarded material is one that has been determined to be an inherently waste-like material by the EPA Administrator. Under certain circumstances, recycled materials are considered discarded materials (and therefore solid wastes) if they are used in a manner constituting disposal, burned for energy recovery, reclaimed, or accumulated speculatively. Certain wastes have been excluded for the definition of solid waste: domestic sewage; point-source discharges regulated under the Clean Water Act (CWA); irrigation return flows; source, special nuclear, or by-product material regulated under the Atomic Energy Act; *in situ* mining waste; pulping liquors that are reclaimed; spent sulfuric acid used to produce virgin sulfuric acid; and secondary materials reclaimed and returned to the original generation process for reuse. The regulatory definition of solid waste may be found in 40 CFR 261.2.

3-2 Hazardous Waste

The Resource Conservation and Recovery Act (RCRA) was passed by Congress in 1976 to address the problem of how to safely manage and dispose of municipal and industrial waste generated nationwide. RCRA creates a framework for the proper management of hazardous and non-hazardous waste. Federal regulations only set a baseline standard with which everyone involved with hazardous wastes must comply. Frequently states choose to adopt more stringent regulations than federal regulations.

RCRA addresses the "cradle to grave" management of hazardous waste. This includes the generation, storage, treatment, transportation and disposal of hazardous wastes. RCRA defines hazardous waste as a solid waste (including liquids and gases), or a combination of

⁵ Some of the wording in this section was adapted from a publication prepared by ENSR Consulting and Engineering, Acton, Massachusetts, entitled "A guide to Permitting, Compliance, Closure, and Corrective Action Under the Resource and Conservation Recovery Act", dated October 1990.

solid wastes which may, because of its quantity, concentration, or physical, chemical or infectious characteristics:

- o cause or significantly contribute to an increase in mortality or in serious irreversible, or incapacitating illness; or
- o pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Certain types of solid waste are excluded from regulation as hazardous waste. These include:

- o household waste;
- o solid wastes generated by growing crops or raising animals, and which are returned to the soil as fertilizers;
- o mining overburden returned to the mine site;
- o ash waste produced from the combustion of fossil fuels;
- o wastes from oil, gas, and geothermal exploration, development, or production;
- o certain wastes failing the toxicity characteristic test including discarded wood or wood products, and petroleum-contaminated media or debris;
- o specific wastes from the extraction, beneficiation, and processing of ores and minerals; and
- o cement kiln dust waste.

See 40 CFR 261.4 for the complete listing of exclusions.

Listed versus Characteristic Hazardous Wastes. Under the current federal regulatory framework, a solid waste is considered a hazardous waste (and therefore subject to requirements of RCRA) if it is either a "listed" waste under 40 CFR Part 261 Subpart D , or a "characteristic" waste under 40 CFR part 261 Subpart C.

A waste is a listed waste if it comes from a process that was found to generate a "hazardous" waste (non-specific source wastes and specific source wastes), or if the waste is a commercial chemical product that has been discarded. Non-specific source wastes are generic wastes commonly produced by manufacturing and industrial processes and specific source wastes consist of wastes from identified industries such as wood preserving, petroleum refining, and organic chemical manufacturing. Commercial chemical products include such items as acetone, creosote, dichlorodiphenyltrichloroethane (DDT), methanol, and toluene. (Refer to 40 CFR Subpart D, Section 261.30-261.33 for listed wastes.

A characteristic waste exhibits any one or more of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. The regulatory definition of hazardous waste appears in 40 CFR 261.20-261.24.

Special Wastes. Non-hazardous solid waste requires handling other than normally used (see 40 CFR 240.101). Special wastes are waste streams that do not come under RCRA, but may come under state hazardous waste requirements or under the Toxic Substance Control Act. States may choose to include items in their state hazardous waste regulations which are not considered hazardous wastes under RCRA.

State Identification and Listing of Hazardous Wastes. The New Hampshire Code of Administrative Rules ENV-WM 400 provides an identification and listing of Hazardous Wastes in New Hampshire. Although these are similar to the RCRA requirements, New Hampshire has included additional listing not found in RCRA.

3-3 Non-Hazardous Waste

For purposes of this plan, non-hazardous wastes are those not considered hazardous waste under federal or state regulation. This would include such items as paper, cardboard, beverage containers, scrap metal (free of any residues) and woody debris.

3-4 Classification of Hazardous Waste Generators

Federal Definitions. The first step in the waste cycle is the generator. Under RCRA regulations, generators must determine if their waste is hazardous and must oversee the management and ultimate fate of the waste. RCRA identifies three different categories of hazardous waste generators. The generator definition is important because applicable waste management regulations vary for each type of generator. These categories are conditionally exempt small quantity generator (CESQG), small quantity generator (SQG), large quantity generator (LQG). For general information, a summary of key RCRA criteria for CESQGs [40 CFR 261.5] and SQGs [40 CFR 262] are:

	<u>Hazardous Waste Generation</u> amount/month	<u>Accumulation of Hazardous Waste</u> maximum amount
CESQG	max. 100 kg (220 lbs)(~26 gal.)	1,000 kg (2,200 lbs)(260 gal.)
SQG	max. 1,000 kg (2,200lbs)(~ 260gal.)	6,000 kg (13,200 lbs)(~1,560 gal.)
	<u>Acute Hazardous Waste Generation</u> amount/month	<u>Acute Hazardous Waste Generation</u> maximum amount
CESQG	max. 1 kg (2.2 lbs)(1 quart)	max. 1 kg (2.2 lbs)(1 quart)
SQG	max. 1 kg (2.2 lbs)(1 quart)	max. 1 kg (2.2 lbs)(1 quart)
	<u>Material from Cleanup of a Spill of</u> <u>Acute Hazardous Wastes</u> amount/month	<u>Material from Cleanup of a Spill of</u> <u>Acute Hazardous Wastes</u> maximum amount
CESQG	max. 100kg. (220 lbs)(~26 gal)	max. 100kg. (220 lbs)(~26 gal)
SQG	max. 100kg. (220 lbs)(~26 gal)	max. 100kg. (220 lbs)(~26 gal)

LQG criteria can be found in 40 CFR 262.

State Definitions. State of New Hampshire Hazardous Waste Rules define two types of generators. Small Quantity Generators (SQG) and Full Quantity generators (FQG). These definitions are found in New Hampshire Rules ENV-Wm 503. The New Hampshire FQG definition includes most RCRA defined SQGs and LQGs. The New Hampshire SQG definition corresponds more closely to the RCRA CESQG definition. The New Hampshire SQG and FQG criteria are listed below.

	<u>Hazardous Waste Generation</u> amount/month	<u>Accumulation of Hazardous Waste</u> maximum amount
SQG	less than 100 kg (220 lbs)(~ 26 gal.)	not listed
FQG	equal to or greater than 100 kg	not listed
	<u>Acute Hazardous Waste Generation</u> amount/month	<u>Acute Hazardous Waste Generation</u> maximum amount
SQG	less than 1 kg (2.2 lbs)(1 quart)	not listed
FQG	equal to or greater than 1 kg	equal to or greater than 1 kg
	<u>Material from Cleanup of a Spill of</u> <u>Acute Hazardous Wastes</u> amount/month	<u>Material from Cleanup of a Spill of</u> <u>Acute Hazardous Wastes</u> maximum amount
SQG	less than 100 kg. (220 lbs)(~26 gal)	not listed
FQG	equal to or greater than 100 kg	equal to or greater than 100 kg

EPA Identification Number. Each project has been assigned an EPA federal facility identification number for reporting purposes. (See Appendix B.) These numbers were assigned to the projects in 1981. At that time the projects were identified as SQGs (federal generator definition). These numbers were issued by EPA to the Corps prior to the Federal Facilities Compliance Act, which was promulgated in 1992. Since the Federal Facilities Compliance Act, the federal projects in New Hampshire are also required to meet the New Hampshire requirements relating to hazardous waste laws and regulations.

Generator Category. Each project should be tracking and documenting on an annual basis the amount of hazardous waste generated per month at the facility. This data can be used to determine what type of generator you are. If your generator category changes or if

other information regarding your facility requires updating, you should notify EPA and the state of these changes. Any actions to modify your generator status or facility information should be approved through NED channels.

Rules on Storing and Disposal of Hazardous Wastes. The project manager should ensure that he is in compliance with both state and federal requirements for hazardous waste generators. In general, these requirements include properly storing and labeling hazardous waste, not exceeding accumulation time criteria, and using the manifest system to ensure that waste is sent by a licensed hauler to an EPA and state approved disposal facility, meeting record keeping and reporting regulations, and providing training to staff.

A comparison of RCRA generator requirements are included in the Environmental Assessment and Management (Team) Guide EC-95/05, page 4-3 and are detailed in the Code of Federal Regulations Title 40, Parts 260-266. New Hampshire requirements are detailed in ENV-WM 100-1000. For informational purposes the RCRA and state generator requirements are summarized on the following pages. For specific information of the generator requirements the project manager should refer to the state and federal regulations.

Comparison of RCRA - CESQG and SQG Generator Requirements (Source: EC/95/05)⁶

<u>Requirement</u>	<u>RCRA CESQG</u>	<u>RCRA SQG</u>
Identify Hazardous Waste	yes	yes
Facility Receiving Waste	State approved or RCRA permitted	RCRA permitted
EPA ID Number	Not Required	Required
RCRA personnel Training	Not Required	Required
DOT Training	Required	Required
Exception Report	Not Required	Required > 60 days
Biennial Report	Not Required	Not Required
Accumulation Time Limits	None	180 days
Use Manifests	No ⁷	Yes
Storage Requirements	None	Comply with regulations

⁶ For LQG requirements see EC/95/05 or CFR Title 40, Parts 260-266.

⁷ It is NED policy that all hazardous waste be manifested regardless of the generator status.

Comparison of State of New Hampshire - SQG and LQG Generator Requirements
(Source: Summary prepared from New Hampshire Hazardous Waste Rules. For full
listing of generator requirements see ENV-WM 100-1000)

	<u>NH SQG</u>	<u>NH LQG</u>
Identify Hazardous Waste	yes	yes
EPA ID Number	Required	Required
Facility Receiving Waste	RCRA permitted	RCRA permitted
Notification of Hazardous Waste Activity Form to NH Department of Environmental Services	yes	yes
Personnel Training	Knowledge Required	Formal Training Required
DOT Training	Required	Required
Accumulation Time Limits	90 days ⁸	90 days
Emergency Equipment	Required	Required
Contingency Plan	Emergency Coord. Plan	Full Contingency Plan
Use Manifests	Yes	Yes
Follow regulations for containers, tanks storage areas, and inspections	Required	Required
Annual Report	See footnote ⁹	See footnote ⁹

⁸ Exceptions to the 90 day rule are listed in ENV-Wm 508.03 and Env-Wm 509.03.

⁹ An annual activity report which summarizes a generators hazardous waste activity during a calendar year shall be submitted by any generator who generates over 100 kg of hazardous waste or 1 kg of acutely hazardous waste in a single month during a calendar year or any generator who recycles, treated or disposed of hazardous waste on-site during a calendar year. (Env-Wm 512.03)

MANAGEMENT OF WASTE STREAMS

4-1 General Solid Waste Management Options

The following is a list of possible solid waste management options.

- a. Purchase and use recycled products.¹⁰
- b. Reduce the amount of waste generated.¹¹
- c. Sort, recycle, and compost appropriate components of the waste stream.
- d. Combust, with energy recovery, the balance of waste that cannot be reduced or recycled.¹²
- e. Landfill wastes that cannot be reasonably be recycled or combusted.

Off-site solid waste management which may be available include recycling and composting facilities, waste processors, solid waste combustion facilities and landfills. The variety of available disposal options should be fully considered in the management of project wastes.

¹⁰ Executive Order 12873 requires Federal agencies to procure products that are environmentally preferable or made with recycled materials. Corps guidance regarding this executive order has not yet been developed.

¹¹ The project Pollution Prevention Plan provides target waste reduction goals.

¹² This management option is not available on-site at the project.

4-2 Solid Waste Generators

There are several different potential waste generation locations at Otter Brook Lake. The following is a list of these sites. General management of these materials is discussed in Chapters 4 and 5.

Project Office. Generates high grade office paper, other recyclable paper (e. g. newspaper), containers (plastic, glass, aluminum), fluorescent lights and light ballasts, household batteries, cardboard and miscellaneous refuse.

Paint Locker in the Project Office. The specialized storage room stores the paint, oil, automobile batteries and hazardous materials.

Petroleum Product Storage Tank. The location of these tanks are described in the Otter Brook Lake Spill Prevention, Control, and counter Measure and Contingency Plan, dated August 1995.

Storage Buildings. Stores the fertilizer, signs, small hand equipment etc...

Control Building at Dam (Gatehouse). Uses fuel oil for the heating unit and hydraulic fluid for the flood control gates.

Log Boom. Captures woody and other debris from flooding events (for example: tires, 50-gal. drums, other miscellaneous refuse).

Picnic Areas/Swimming Beaches/Boat Launch. In order to minimize waste generation at the recreation areas, a carry in/carry out policy has been implemented. At the entrance to the recreation areas visitors are informed of this policy and provided with a garbage bag in which to collect their refuse and carry it away when they leave.

Public Rest Rooms. Public rest rooms are located at the Project Office and at the recreation area. Paper hand towels are provided and disposed of in trash cans in the rest rooms.

Rain Gage. Propylene glycol antifreeze is used in the rain gage.

Project lands. Generates trash illegally dumped at project by the public - old tires, yard waste, aluminum cans etc. (Corps access roads are gated and closed during non-recreation times and help to prevent illegal dumping of trash on project lands. However, public roads do abut project lands and some dumping occurs along these roads.)

Renovation/Construction at Project. May generate asphalt and building construction debris.

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MANAGEMENT OF HAZARDOUS WASTE

5-1 General Requirements

The following is a general outline of hazardous waste management requirements. The project manager should refer to the New Hampshire Hazardous Waste Management Rules for detailed information. Where the hazardous waste generating activity is carried out by a Corps contractor, the contractor will be required to follow all applicable state, local and federal regulations.

A separate collection, packaging and storage system should be established, so that all wastes are properly segregated, identified and labeled to facilitate disposal through a licensed contractor.

The use of materials which generate hazardous waste should be minimized. Hazardous materials should be purchased in minimal quantities for completion of the task at hand.

The hazardous waste should be stored in a container made of or lined with materials which will not react with, and are otherwise compatible with, the hazardous waste to be stored in the container. Container must be Department of Transportation approved for highway transportation.

The hazardous waste storage area must meet the requirement of federal and state hazardous waste regulations. In general the area must be identified by the appropriate signs. The storage area floor must be impermeable, safety and emergency equipment must be available, and there must be adequate aisle space.

Throughout the period of storage or treatment, each container shall be clearly marked and labelled in a manner which identifies, the date accumulation began, the hazardous waste(s) being stored or treated in the container, and the hazard(s) associated with the hazardous waste (e.g., ignitable, toxic, dangerous when wet). Each container shall also be marked clearly with the words "Hazardous Waste". New Hampshire hazardous waste storage

requirements are detailed in ENV-WM 507. The period of storage should not exceed that allowed by New Hampshire regulation.

The generating activity is responsible for preparation of containers and documentation for disposal and should comply with Department of Transportation Regulations for transport of hazardous materials. Containers must be accompanied by proper documentation and any other information required by the contractor, such as Material Safety Data Sheets (MSDSs), laboratory analysis results, or waste profile data.

Hazardous waste should be disposed of through a licensed hauler and sent to a permitted facility. A hazardous waste manifest will accompany any materials and appropriate record keeping will be utilized. Only those persons formally designated and authorized by the Division Commander are authorized to execute hazardous waste manifests and related documents. The formal designation and authorization must be in writing and state the employee is within their scope of employment when executing such documents.¹³ Records of the authorization should be kept on file. DOT manifest training must be current. Expiration of training will void formal designation authority. (See Appendix D)

New Hampshire hazardous waste manifest requirements are detailed in the New Hampshire Rules Env-Wm 510. It is suggested that all records regarding Hazardous Wastes be maintained at the project office for a minimum of 7 years. (The 7 year time frame is specified in Env-Wm 512.)

Inspections should be conducted at hazardous waste storage areas to monitor any spills and leaks.

Specific Petroleum, Oil, and Lubricant requirements are included in the Spill Prevention, Control and Countermeasures Plan (SPCCP), and Spill Contingency Plan for Otter Brook Lake dated, August 1995.

Infectious wastes (medical) are regulated as a solid waste under NH RSA Chapter 149-M and the New Hampshire Solid Waste Rules (reference Part Env-Wm

¹³ At the Otter Brook Lake project, Mr. John Boyea and Mr. James Lewis are designated to sign hazardous waste manifests.

illegally dumped at the project site, they should not be disposed of by project staff. The area where the waste is located should be secured and posted as to the hazard. The Local Board of Health and the NH Department of Environmental Services, Waste Management Division, Special Investigation Section (603-271-3899) should be immediately notified to determine the appropriate course of action. The Division Safety Officer should also be notified regarding any medical wastes found on project lands.

5-2 Specific Suggestions for Disposal of Hazardous Waste.

Waste Oil. Waste oil is a "listed" New Hampshire hazardous waste. However, if your waste oil is to be recycled, it is regulated under New Hampshire regulation ENV-Wm 807 "requirements for management of used oil being recycled". A summary of Used Oil Regulations is included in Appendix C.

All flood control project automobiles are serviced off-site including oils changes. However, if there is any used oil generated at the project this should be handled in manner consistent with state regulations.

Used Oil Filters. Under the federal hazardous waste regulations, used oil filters may be considered a hazardous waste. There is an exemption from hazardous waste requirements if all the oil is removed from the filter and if the filter is not lead plated.

NH regulations also require removal of all the oil and recommend recycling of used oil filters. An explanation of requirements for used oil filters is included in Appendix C.

In general, all project vehicles and equipment are serviced by a service contractor. The service contractor is responsible for appropriate recycling or disposal of the used oil filters.

Cleaning Solvent. Project staff reported that an organic based non-toxic cleaning solvent is used at the site. Be aware that many degreasing solvents when disposed of are hazardous wastes.

Lead Acid Batteries. New Hampshire requires that lead-acid batteries be recycled where possible. Disposal in landfill and incineration is prohibited. When not possible to recycle, for example if batteries are damaged or not in condition for acceptance by the recycler, they are subject to the hazardous waste requirements. When recycling, the generator must comply with regulations detailed ENV-Wm 809 and with regulations in the states non-hazardous waste regulations for storage of batteries.

Other Batteries. Eight metals are commonly used in batteries: mercury, cadmium, lead, zinc, manganese, nickel, silver, and lithium. Batteries should not be disposed of as miscellaneous refuse.

Batteries should be recycled in compliance with the EPA standards for Universal Waste Management [40 CFR 273]. Spent batteries that can not be recycled should be handled as hazardous waste. Be aware that some of the newly manufactured batteries may be below toxicity levels for hazardous waste.

Antifreeze. A determination should be made as to whether or not any waste antifreeze generated at the project is considered a hazardous waste. If it is, the storage and disposal must comply with all state and federal hazardous waste regulations. In general, all vehicle maintenance is done off-site by a service garage or on-site by a contractor.

Surplus Paint and Allied Products. These may include oil-based paint, paint thinners, turpentine, varnishes, shellacs or polyurethane. Purchase of these products should be on an as needed basis. Any residues should be disposed of in accordance with state and federal hazardous waste regulations.

Pesticides/Herbicides. Careful selection, inventory and control of materials will help to reduce or eliminate their disposal. Any residues should be disposed of in accordance with state and federal hazardous waste regulations.

All of the herbicide activities, at the project, are carried out by a contractor. All contractors are required to be state licensed and to comply with applicable state and federal regulations. Project staff reported that no pesticides are used at the project.

Treated Wood. Some wood is chemically treated to enhance its resistance to rot and insect damage. Treatment extends use from 3-5 years to 20-50 years or longer. The four most common mediums to treat wood are creosote, inorganic arsenical, pentachlorophenol (PC), and Copper Napthenate. Treated wood is not a "listed" hazardous waste under Federal Regulations. However, it is subject to the Toxicity Characteristics Leaching Procedure (TCLP) to determine if the wood is a "characteristic" hazardous waste (40 CFR 261.24).

If the treated wood is determined to be a hazardous waste, it should be stored and disposed of in accordance with state and federal regulations.

Fluorescent Lights and Ballasts. These items are known to contain hazardous materials. They should not be disposed of as miscellaneous refuse. Light ballast may contain polychlorinated biphenyls (PCBs) and florescent lamps contain varying levels of mercury.

In New Hampshire the ballasts containing PCBs are subject to the federal U.S. Toxic Substances Control Act and the federal regulations in Title 40 of the CFR part 761. You must determine if the ballasts contain PCBs and if so comply with these regulations.

The New Hampshire Department of Environmental Services (DES) considers spent fluorescent lamps, which exceed the limits established by the TCLP test, to be hazardous waste and subject to New Hampshire Hazardous Waste Rules. However, the DES exempts unbroken fluorescent lamps from the New Hampshire Hazardous Waste Rules if they are recycled by an authorized facility.

Empty Containers. The federal regulations regarding residues of Hazardous Wastes is based on the definition of "empty". If the container is "empty", then the container is not subject to the hazardous waste regulations. However, a container is only considered empty if it meets the criteria in 40 CFR 661.7. The New Hampshire definition of empty is very similar to the federal definition and is included in Env-Wm 401.03. The federal criteria is summarized below.

(1-i) All waste has been removed that can be using the practices commonly employed to remove materials from that type of container,

(1-ii) and no more than 2.5 centimeters of residue remain at the bottom of the

container,

(1-iii) or no more than 3 percent by weight of the total capacity of the container remains in the container if the container is less than 110 gallons in size and no more than 0.3 percent by weight of the total capacity if the container is greater than 110 gallons in size.

(2) A compressed gas container that held a hazardous waste that is empty when the pressure in the container approaches atmospheric.

(3) If the container has held an acute hazardous waste then the container must be cleaned by triple rinsing, using a solvent capable of removing the product; or the container must be cleaned by another method that has been shown in the scientific literature to achieve equivalent removal.

MANAGEMENT OF NON-HAZARDOUS WASTE

6-1 General Requirements

Recreational Waste Collection. Covered waste containers are not provided at public use areas. A Carry In/Carry Out policy has been implemented. Visitors are provided with a garbage bag when they enter the park.

Miscellaneous Waste Collection. There are two dumpsters located at the project, a 2-yard dumpster located outside the project office and a 10-yard dumpster located at the recreation area. The dumpsters are emptied on a weekly basis by a disposal contractor. These dumpsters should not be used for recyclable materials.

6-2 Recyclable Waste

Beverage Containers (glass and plastic bottles, aluminum cans). These items should be recycled. (See fact sheets in Appendix E "Recycling Glass", "Recycling Aluminum Containers", "Recycling Steel Cans", and "Recycling Plastics".)

High Grade Office Paper/Newspapers/Cardboard/Mixed Paper. High grade office paper is recyclable and should be collected in separate containers for recycling. Cardboard and newspaper may also be recycled. (See fact sheets in Appendix E "Recycling Office Waste Paper", "Recycling Cardboard" and "Recycling Newspaper".)

Scrap Metal. Scrap metal should also be recycled. (See fact sheet in Appendix E "Scrap Metal Management".)

Toner/Ink Jet Cartridges and Printer Ribbons. There are several commercial establishments in New Hampshire that recycle these items. A list of recyclers is provided in Appendix E.

6-3 Compostable Waste

Leaves/woody debris (yard waste)/woody log boom debris. There is no composting available at the project. This type of waste should be removed by a disposal contractor from the project.

6-4 Non-recyclable Wastes

Miscellaneous Refuse and Non-Recyclable Paper. This waste should be picked up by a licensed contractor and disposed of properly by the contractor.

6-5 Difficult to Manage Wastes

Construction and Demolition(C&D). This waste is debris generated from construction, renovation, repair, and demolition of roads, bridges, and buildings. It includes wood, steel, concrete, masonry, plaster, metal, and asphalt. At the project, the disposal of this material will be the responsibility of the construction contractor for any renovation project. The material should be disposed of at an approved C&D disposal facility.

Tires. New Hampshire discourages landfilling of scrap tires. The preferred option is reuse, reclaiming the rubber, and incineration with resource recovery. Contact the local community to determine the available options. See fact sheet in Appendix E "Scrap Tire Management."

White Metal Goods. White metal goods are household appliances which include refrigerator, water heaters, electric ranges etc... The preparation of discarded white metal goods for bulking may be done by a municipality, an appliance dealer or a processor.

Be aware that refrigerators are likely to contain Chlorofluorocarbons (CFCs). CFCs are regulated under air pollution regulations. Also, white metal goods contain small capacitors which may contain PCBs. PCBs are regulated under TSCA regulations.

Ozone Depleting Substances (ODSs). It is the policy of the Corps to minimize the procurement of materials and substances that contribute to the depletion of stratospheric ozone; and give preference to the procurement of alternative chemicals and products that reduce the overall risks to human health and the environment by lessening depletion of ozone in the upper atmosphere. In addition, ODS "Elimination Plans" are to be developed for each project. A memorandum outlining this policy is included in Appendix F.

Chlorofluorocarbons may be contained in air conditioners, water coolers, dehumidifiers, refrigerators and automobile air conditioners. CFCs are regulated under air pollution regulations. Individuals servicing and disposing of air conditioning and refrigeration equipment are prohibited from knowingly venting refrigerant into the atmosphere. At the flood control project these units are serviced off-site. The service contractor is required to provide documentation indicating that they are certified by EPA to deal with this material. Any new equipment purchased should maximize the use of safe alternatives to these ozone depleting substances.

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RESPONSIBILITIES

7-1 The Division Environmental Coordinator

The Environmental Coordinator is responsible for the following items.

- o Provide technical assistance and guidance to project manager in developing environmentally safe procedures for solid waste management.
- o Provide oversight of required permits and renewals, and EPA hazardous waste generators application numbers.
- o Review and approve Solid Waste Management Plan, revision, and amendments.

7-2 The Project Manager ¹⁴

The Project Manager is responsible for the following items.

- o Program sufficient funds to insure compliance with solid waste management requirements.
- o Maintain a complete and current inventory of stored hazardous materials and hazardous waste at the project.
- o Assure that only those properly trained and designated by the Commander will handle hazardous waste at the project and sign hazardous waste manifests.
- o Monitor facility compliance with hazardous waste manifest procedures and

¹⁴ Project Environmental Compliance Coordinators (ECCs) are being designated for each river basin. One of their functions will be to support field management of hazardous wastes.

make recommendations for corrective actions or procedural changes when necessary or advisable.

- o Maintain copies of all relevant regulations, directives, and guidance on hazardous materials, wastes and POLs at the project and keep these materials in an organized, highly visible manner.
- o Arrange for any testing of materials suspected of being hazardous wastes.
- o Inspect storage areas for malfunctions and deterioration, operator errors and discharges which may be causing or leading to the release of waste constituents into the environment or are a threat to human health. Inspections must be conducted to identify potential problems in time to correct them before a problem occurs.
- o Assure reuse of recycled materials when possible and feasible. Appropriate disposal and recycling specifications should be included in purchase requests or contracts.
- o Maintain material safety data sheets in the project office for staff to review.
- o Review this Solid Waste Management Plan and make any necessary revisions to the Plan.

TRAINING

8-1 Hazardous Waste Training

Training is an important component of regulatory compliance. Training should be carried out to ensure that all personnel working in facilities with hazardous wastes are knowledgeable of hazardous waste management requirements, emergency procedures, and spill reporting requirements.

Department of Transportation regulation 49 CFR 172.700 (Subpart H-training) requires the training of employees who load, unload or handle hazardous materials for transportation, assure the safety of the shipment, or operate a motor vehicle used to transport hazardous materials.

Only employees formally designated, trained and authorized by the Division Commander are authorized to execute hazardous waste manifests and related documents. Records of the authorization should be kept on file. DOT manifest training must be current. Expiration of training will void formal designation authority. The formal designation and authorization must be in writing and state the member is within their scope of employment when executing such documents. Each project unit should have at least one person formally designated and trained for this function.

All hazardous waste management training should be coordinated with the Division Environmental Compliance Coordinator and Safety Officer.

8-2 Other Training

Although there is no specific training requirements for non-hazardous solid waste management, the Project Manager is encouraged to provide educational recycling information to employees for their information.

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GLOSSARY TERMS AND ABBREVIATIONS

CFR - Code of Federal Regulations

Certification - A statement of professional opinion based upon knowledge and belief.

CFCs - Chlorofluorocarbons

Construction and Demolition Waste (C&D) - Construction and demolition waste (C&D) is debris generated from construction, renovation, repair, and demolition of roads, bridges, and buildings. It includes wood, steel, concrete, masonry, plaster, metal, and asphalt. These wastes have a number of beneficial uses, e.g. crushing asphalt and concrete/brick separately or in conjunction with virgin materials to produce recycled asphalt paving; process gravel, road base, and solid fill. Chipping and grinding wood treated with preservatives produces boiler fuel, a bulking agent for sludge composting; wood fiber, and erosion control for landfills. Untreated wood can be chipped for landscape mulch.

Container - A portable device in which a material or waste is stored, transported, treated, disposed of, or otherwise handled.

CWA - Clean Water Act

Disposal - The discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste or hazardous waste into or on any land or water so that such waste (or any constituent thereof) may enter the environment or be emitted into the air or discharged into any waters, including ground waters.

DoD - Department of Defense

DOT - The United States Department of Transportation

ECC - Project environmental compliance coordinator

EPA - The United States Environmental Protection Agency

Generator - A person who produces or creates hazardous waste identified or listed under RCRA (relating to criteria, identification, and listing of hazardous waste).

HSWA - Hazardous and Solid Waste Amendments of 1984 (to RCRA)

Hazardous Material - (1) A substance or material which has been determined by the Secretary of the U.S. Department of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been designated.
(2) Is listed in 49 CFR, Part 172.101, Hazardous Materials Table.

High Grade Paper - Includes letterhead, dry copy papers, miscellaneous business forms, stationery, typing paper, tablet sheets, and computer paper.

Management - The entire process, or any part, of storage, collection, transportation, treatment, and disposal of hazardous wastes by person engaging in such process.

Manifest - The shipping document EPA Form 8700-22, and if necessary, EPA Form 8700-22A, originated, signed, and distributed in accordance with the instructions supplied with the manifest form and applicable state requirements.

Manifest System - The manifest, instructions supplied with the manifest, and distribution system for copies of the manifest which together identify the origin, routing, and destination of hazardous waste from the point of generation to the point of treatment, storage or disposal.

NGVD - National Geodetic Vertical Datum-MSL of 1929.

ODSs - Ozone depleting substances

POL - petroleum, oil and lubricants

RCRA - Resource Conservation and Recovery Act of 1976. (P.L.94-580, as amended)

Resource Recovery - The process of obtaining materials or energy from solid waste.

Source Separation - The separation of recyclable materials at their point of generation by the generator.

Storage - The holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.

TCLP - Toxicity Characteristics Leaching Procedure

TSCA - Toxic Substance Control Act.

REFERENCES

ENSR Consulting and Engineering, Acton, Massachusetts. October 1990. "A Guide to Permitting, Compliance, Closure, and Corrective Action Under the Resource and Conservation Recovery Act."

U.S. Army Corps of Engineers, Baltimore District. July 1993. POL Waste Liquid and Hazardous Waste Management Plan for Baltimore District, Project Operations Branch.

U.S. Army Corps of Engineers, New England Division. 1994. Environmental Compliance Assessment of Otter Brook Lake, Keene, New Hampshire.

U. S. Army, Corps of Engineers, New England Division. February 1995. Hazardous Waste Management Manual for U. S. Army Reserve Centers in the State of New Hampshire. Prepared for the Department of the Army 94th Regional Support Command. Prepared with technical assistance from ENSR Consulting and Engineering, Acton, Massachusetts.

U.S. Army Corps of Engineers, New England Division. August 1995. Spill Prevention, Control, and Countermeasure Plan and Spill Contingency Plan for Otter Brook Lake.

U.S. Army Corps of Engineers, New England Division. Scheduled to be completed September 1996. Pollution Prevention Plan for Otter Brook Lake.

APPENDIX A

TOWN ORDINANCES



CITY OF KEENE

0-94-31-E

In the Year of Our Lord One Thousand Nine Hundred and Ninety-Four

AN ORDINANCE RELATING TO WASTE MANAGEMENT

Be it ordained by the City Council of the City of Keene, as follows:

That the Ordinances of the City of Keene, as amended, are hereby further amended, by deleting Subsection 5, Municipal Landfill of Subsection C, Ordinances Relative to the Public Works Department of Section 10, Public Works Department and Airport Department of Chapter 7, Administrative Departments and creating in its stead a new Chapter 3200.0 to be entitled "Waste Management" as indicated in the following bolded text:

3201.0 DEFINITIONS. The following definitions shall apply in the interpretation and enforcement of this Chapter.

Brush-

Organic material which constitutes trimmings with a diameter greater than one (1) inch.

Bulky Waste-

Waste material from a residential or commercial source other than construction debris or hazardous waste. Appliances are defined as refrigerators, stoves, washer/dryer, freezer, air conditioners or any other appliances normally placed on the floor. Tires include passenger vehicle, truck and off-highway sizes.

Commercial Refuse-

Discarded waste materials in a solid state from any commercial (including multi-unit dwellings such as apartment complexes, condominium units, etc.), or industrial source.

Construction Debris-

Waste building materials resulting from construction, remodeling, repair or demolition operations.

Disposal Site-

A refuse depository for the processing or final disposal of refuse, including but not limited to sanitary landfills, transfer stations, incinerators and waste processing separation centers, licensed, permitted or approved by all governmental bodies and agencies having jurisdiction.

Hazardous Waste

Wastes that are hazardous by reason of their pathological, explosive, radiological or toxic characteristics, as defined by State and Federal regulations.

Individual-

Any resident of Keene or other member community.

PASSED

Private Contractor-

An individual, firm, partnership, joint venture, corporation or association performing refuse/recycling collection and disposal services for more than one (1) family or for a commercial/industrial establishment not owned by said entities for a collection service fee.

Recyclables-

Material including: glass food and beverage containers, steel cans, aluminum cans, aluminum foil, HDPE #2 (High Density Polyethylene) and PETE #1 (Polyethylene Terephthalate) plastics, newspapers, mixed paper, paper bags, office paper, magazines, corrugated cardboard, used clothing, used oil, automobile batteries and yard trimmings (leaves, grass clippings, pine needles).

Recyclable Contamination-

Any recyclable material that is rendered unrecyclable through the presence of foreign material that cannot be removed by the recycling process. Any contaminated recyclables will be subject to disposal fees.

Residential Refuse-

Discarded non-recyclable waste materials in a solid state from any single-family residence.

Yard Trimmings-

Organic material including leaves, grass trimmings, pine needles.

3202.0 MANAGEMENT. All solid waste management activities shall be under the direction of the Director of Public Works.

3203.0 MATERIAL. All material brought to the solid waste facility shall be classified as follows:

Bulky Waste, Construction Debris, Residential Refuse, Commercial Refuse, Yard Trimmings, Brush and Recyclables as defined in Section 3201.0.

3204.0 OPERATING HOURS. The Keene Recycling Center, Transfer Station and Municipal Landfill will operate on the following schedule as minimum hours of operation:

Monday-Friday:	7:00 a.m. - 3:00 p.m.
Saturday:	8:00 a.m. - 1:00 p.m.
Sunday:	Closed

The solid waste facilities will be closed on the following holidays:

New Year's Day	Labor Day
Memorial Day	Thanksgiving
Independence Day	Christmas

3205.0 TIPPING FEE - RESIDENTIAL, COMMERCIAL REFUSE, CONSTRUCTION DEBRIS. Effective 30 days after adoption of this chapter, a tipping fee will be based on weight at the rate of \$55.00 per ton pro-rated

3206.0 TIPPING FEE - BULKY WASTE. Bulky waste as defined in Section 3201.0 may be handled by the individual or by arrangement with a private contractor. Bulky items must have an appropriate ticket dependent on the particular item to cover the cost of disposal.

Specially marked tickets as approved by the Public Works Director, to be sold by the City at the City of Keene Tax Office will apply for the following items: Appliances including: refrigerators, stoves, washer/dryers, freezers, air conditioners, etc., will require a \$15.00 bulky waste ticket. Passenger car tires will require a \$1.50 ticket, truck tires a \$5.00 ticket and off-highway tires a \$125.00 ticket.

3207.0 TIPPING FEE - YARD TRIMMINGS/BRUSH. The City of Keene Recycling Center will accept leaves and grass clippings from individuals and private contractors at no charge. Brush and other bulky yard waste (such as stumps) will require a payment of a fee at the rate of \$55.00 per ton pro-rated. It is against New Hampshire state law (RSA 149-M:22, VII) to dispose of yard trimmings or brush in a landfill or incinerator. Therefore all yard trimmings and brush must be separate from all incoming refuse. The Director of Public Works will designate an area for depositing yard trimmings, brush and other bulky yard waste. A single trip ticket as described in Section 3208.0 shall not be required to dispose of yard trimmings.

3208.0 PERMITS/LICENSE FOR INDIVIDUALS. Individuals may continue to transport their own refuse to the solid waste facility. Each trip to the solid waste facility will require a \$7.00 single trip ticket for up to 250 pounds of refuse. Refuse loads that weigh more than 250 pounds will be charged by weight based on \$55.00 per ton pro-rated. All recyclable material may be brought to the solid waste facility at no charge, however, paper products must be separated from containers (glass, steel, aluminum, plastic, etc.) by the individual.

3209.0 CONTAINERS. Refuse containers, once emptied, must be removed by the owner from the public way within twenty-four (24) hours. Any debris strewn from this refuse by animals, wind, or other cause, shall be cleaned up by the owners within twenty-four (24) hours. Private contractors will be responsible for any debris they drop or spill on the ground and shall clean it up before moving on to the next stop.

All recyclable material (including material from individuals) must be delivered loose to the recycling facility. In addition, paper products must be separated from containers (glass, steel, aluminum, plastic, etc.) to avoid contamination of material.

3210.0 HAZARDOUS WASTE. Hazardous waste as defined in Section 3201.0 will not be accepted at the solid waste facility from individuals or from private contractors unless in conjunction with an authorized household hazardous waste pickup.

3211.0 PUBLIC WAY PICKUP/DROP-OFF RECYCLING. Users of the solid waste facilities shall participate in the segregation of recyclables in accordance with the following provisions:

Those items as defined in Section 3201.0 "Recyclables" will be accepted at the Keene Recycling Center at no charge. All recyclables must be free of contaminants. Containers (glass, steel, aluminum, plastic, etc.), must be separate from paper products.

Individuals may at the same time they deposit municipal waste at the solid waste facility, deposit their segregated recyclables at the drop-off recycling location provided by the City on Route 12 North and any other designated locations.

Recyclables accepted at the drop-off center shall include but not be limited to: glass food and beverage containers, steel cans, scrap metal, aluminum cans, aluminum foil, HDPE #2 and PETE #1 plastics, newspapers, mixed paper, paper bags, office paper, magazines, corrugated cardboard, used clothing, automobile batteries and yard trimmings (leaves, grass clippings, pine needles). Used oil may be brought to the Public Works Garage, 580 Main Street, Keene.

Individuals who use commercial haulers shall source separate their recyclables and place them out for collection by their private contractor. The City will determine which materials will be accepted for public way pickup including, but not be limited to the following material: glass food and beverage containers, steel cans, aluminum cans, HDPE #2 and PETE #1 plastics, newspapers, and magazines/catalogs. In addition, paper products must be separated from

containers (glass, steel, aluminum, plastic, etc.) to avoid contamination of material. All recyclables shall be free of contaminants. Private contractors may pick up such source separated recyclables along with normal refuse but must be kept separate. Any recyclable item as defined in **Section 3201.0** not accepted for public way pickup may be brought to the drop-off facility at no charge.

3212.0 VIOLATIONS AND PENALTIES. Any private contractor or individual found to be in violation of any provision of this Ordinance shall be guilty of a violation punishable by a fine of up to \$1,000. In addition to other penalties provided for in the ordinance, any private contractor or individual found by the Public Works Director to be in violation of this Ordinance may be subject to temporary or permanent suspension from access to the City Solid Waste Facility.

A first offense may result in suspension from the City Solid Waste Facility for a period of up to thirty (30) days.

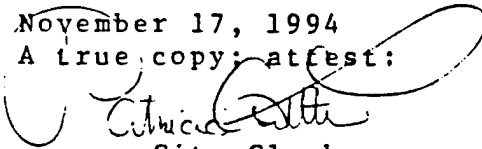
A second or subsequent offense shall result in suspension from the City solid waste facility for such period as the Public Works Director may determine and may result in permanent suspension from the City Solid Waste Facility.

3213.0 APPEALS. Any private contractor or individual who is aggrieved by a decision or rule of the Public Works Director, may petition the Public Works, Recreation and Airport (PWRA) Committee of the City Council for review of that decision but except as hereinafter provided, shall immediately abide by such decision of the Public Works Director. Appeal of any decision may be initiated by submitting a written appeal to the Director of Public Works within ten (10) days of the decision. The decision of the Public Works Director may be stayed by the City Manager pending appeal upon request of the private contractor for good cause shown. A hearing shall be held before the PWRA Committee whose decision shall be final.

3214.0 RULEMAKING. The Public Works Director is hereby authorized to establish rules and regulations for the effective administration of this Ordinance subject to the approval of the PWRA Committee of the Keene City Council.

3215.0 DATE ORDINANCE BECOMES EFFECTIVE. The effective date of this ordinance shall be January 1, 1995.

Passed: November 17, 1994
A true copy: attest:


Patricia Little
City Clerk

William F. Lynch, Mayor

APPENDIX B

**U.S. EPA IDENTIFICATION NUMBERS
FOR THE FLOOD CONTROL PROJECTS
(list furnished by U.S. EPA)**

DISTRICT

FEB 1931

INS # INSTALLATION NAME

CO

NEW ENGLAND DISTRICT

00047	ANSONIA-DERRY LDC PROT	CT
00048	CH BET NO&SO BROS ILS	VT
00049	CHATHAM STAGE HARBOR	MA
00050	DERBY COAL PROTECTION	CT
00051	DICKEY/LINCOLN SCH LAKE	ME
00053	PAWTUCKET COVE	RI
00054	PLYMOUTH-LONG BEACH DIK	MA
09607	MANSFIELD HOLLOW LAKE	CT
09813	BIRCH HILL DAM	MA
09814	CAPE COD CANAL	MA
09815	KNIGHTVILLE DAM	MA
09817	TULLY LAKE	MA
09897	BLACKWATER RESERVOIR	NH
09898	EDWARD MACDOWELL LAKE	NH
09899	FRANKLIN FALLS RESERV	NH
09900	SURRY MOUNTAIN LAKE	NH
10143	UNION VILLAGE RESERVOIR	VT
11421	KENNERBUNK RIV JETTY	ME
12528	BALL MOUNTAIN RESERVOIR	VT
12533	HOPKINTON-EVERETT LAKES	NH
12535	NORTH SPRINGFIELD LAKE	VT
12541	THOMASTON DAM	CT
12542	TOWNSHEND LAKE	VT
12545	HODGES VILLAGE DAM	MA
12566	EAST BRIMFIELD LAKE	MA
12567	SUNFOMVILLE RESERVOIR	MA
12568	BARRE FALLS RESERVOIR	MA
12572	OTTER BROOK RESERVOIR	NH
12580	NORTH HARTLAND LAKE	VT
13528	WEST HILL DAM	MA
13663	WESTVILLE LAKE	MA
14726	LITTLEVILLE LAKE	MA
14746	RELAY STATION BUILDING	MA
15492	HANCOCK BROOK LAKE	CT
15503	NORTHFIELD BROOK LAKE	CT
15512	WEST THOMPSON LAKE	CT
16060	CHICOPEE FALLS LOCAL PR	MA
16061	CUNANT BROOK DAM	MA
16074	RELAY STATION BUILDING	CT
16080	PT JUDITH BREAKWATER SI	RI
19336	COLEBROOK RIVER LAKE	CT
19337	HOP BROOK LAKE	CT
19338	RELAY STATION BUILDING	VT
19808	BLACK ROCK LAKE	CT
19817	COLEBROOK RIVER LAKE	MA
32394	CHARLES RIVER NVS	MA

APPENDIX C

GENERAL INFORMATION ON STATE HAZARDOUS WASTE PROGRAM



NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION

IDENTIFICATION OF HAZARDOUS WASTE

as provided in New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000

The New Hampshire Hazardous Waste Rules [Env-Wm 110.01(b)(47)] define hazardous waste as any solid, semi-solid, liquid, contained gaseous waste, or any combination of these wastes, which:

- a) may cause or contribute to an increase in irreversible or incapacitating reversible illness; or
- b) poses a present or potential threat to human health or the environment if improperly managed; or
- c) has been identified as a hazardous waste by the Waste Management Division.

Characteristics of Hazardous Waste

1. Is it ignitable? (flash point less than 60° Celsius or 140°F as per Env-Wm 403.03).
2. Is it corrosive? (pH less than or equal to 2 or greater than or equal to 12.5 as per Env-Wm 403.04).
3. Is it reactive? (reacts violently - see Env-Wm 403.05).
4. Is it EP Toxic? (contains heavy metals, pesticides, or herbicides listed in Env-Wm 403.06).

Lists of Hazardous Wastes

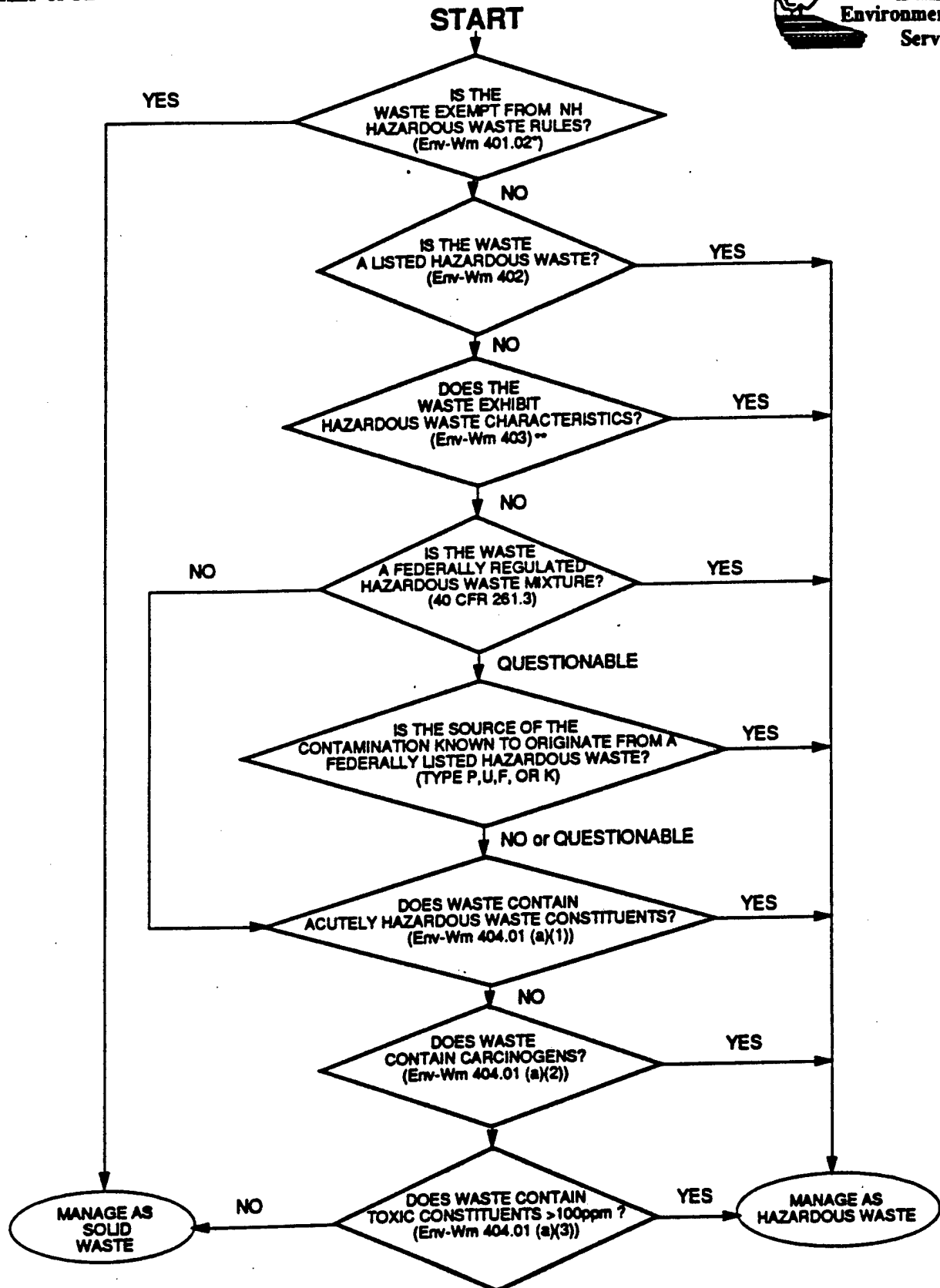
1. Is it listed in Env-Wm 402.04? (acutely hazardous wastes).
2. Is it listed in Env-Wm 402.05? (toxic hazardous wastes).
3. Is it listed in Env-Wm 402.06? (hazardous generic industrial process waste).
4. Is it listed in Env-Wm 402.07? (hazardous specific industrial process waste).
5. Is it a hazardous waste mixture pursuant to Env-Wm 404.01?
6. See Chapter Env-Wm 400 of the Hazardous Waste Rules for additional information.

This summary provides general information only. Should there be additional questions, please contact the Dept. of Environmental Services, Waste Management Division at (603)271-2942. For a complete description of the requirements, refer to New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000, which may be obtained by contacting NHDES at 6 Hazen Drive, Concord, NH, 03301. Telephone: (603)271-2975.

HAZARDOUS WASTE DETERMINATION



NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services



- * The EPA is more stringent than NH and requires the TCLP test for gasoline contaminated soils. UST's are exempt from TCLP organics as per 40 CFR 261.4(b)(10).
- ** EPA requires TCLP



Department of Environmental Services
Waste Management Division
Waste Management Compliance Bureau
(603) 271-2942

LABORATORIES THAT TEST HAZARDOUS WASTE

The following tests are commonly requested for hazardous waste determinations. Not all of the laboratories listed perform each test. It is important to contact them to ensure both the availability of the required test and, most importantly, their use of the required methodology ("Test Methods for Evaluating Solid Waste, Physical/Chemical Methods: - EPA Publication SW-846, or as specified in the NH Hazardous Waste Rules).

Ignitability	Extraction Procedure Toxicity (EPTox)
Corrosivity	Volatile Organic Compounds (VOC)
Reactivity	Cyanide (total and amenable)
Pesticides	Acid/Base/Neutral Extractables (ABNs)
Sulfides	Toxicity Characteristic Leaching Procedure (TCLP)

COMPANY NAME, ADDRESS & TELEPHONE NUMBER

<u>Accutest Laboratories of New England</u> Bldg. 1, 495 Technology Center West, Marlboro, MA 01752	(508) 481-6200
<u>Alpha Analytical Laboratories</u> Eight Walkup Drive, Westborough, MA 01581	(508) 898-9220
<u>AMRO Environmental Labs Corp.</u> 11 Herrick Street, Merrimack, NH 03054	(603) 424-2022
<u>Aquarian Analytical</u> PO Box 186, Canterbury, NH 03224	(603) 783-9097
<u>Aquatec Inc.</u> 55 South Park Drive, Colchester, VT 05446	(802) 655-1203
<u>Camp Dresser & McKee, Inc.</u> RTC, 840 Memorial Drive, Cambridge, MA 02139	(617) 354-4448
<u>ChemServe, Inc.</u> 317 Elm Street, Milford, NH 03055	(603) 673-5440
<u>Clean Harbors Environmental Services</u> 325 Wood Road, Braintree, MA 02184	(617) 849-1800
<u>Eastern Analytical Inc.</u> 25 Chennell Drive, Concord, NH 03301	(603) 228-0525
<u>Granite State Analytical Inc.</u> 22 Manchester Road, Derry, NH 03038	(603) 432-3044
<u>GTEL Environmental Labs Inc.</u> Meadowbrook Ind Park, Milford, NH 03055	(603) 672-4835

Laboratories List
Page 2

<u>GZA Environmental Inc.</u> 320 Needham Street, Newton Upper Falls, MA 02164	(617)969-0050
<u>Matrix Analytical Inc.</u> 106 South Street, Hopkinton, MA 01748	(508)435-6824
<u>Northeast Laboratory</u> PO Box 788, Waterville, ME 04901	(207)873-7711
<u>PACE of New England Inc.</u> PO Box 2130, Hampton, NH 03842	(603)926-7777
<u>Peck Environmental laboratories</u> PO Box 947, Kennebunk, ME 04043	(207)985-6116
<u>Resource Laboratories</u> 124 Heritage Ave, #10, Portsmouth, NH 03801	(603)436-2001
<u>Watertest Corporation</u> 28 Daniel Plummer Road, Goffstown, NH 03045	(603)623-7400

NOTE: This is not a complete list of all laboratories available, nor does it imply endorsement from the Department of Environmental Services.

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NEW HAMPSHIRE RESOURCES FOR INFORMATION & ASSISTANCE



NH Pollution Prevention Program

Vincent Perelli.....(603) 271-2902
Kathy Blake.....(603) 271-6460
Paul Lockwood.....(603) 271-2956
(Toll free within NH).....(800) 273-9469

Provides non-regulatory multi-media waste reduction assistance for businesses, maintains an in-house pollution prevention technology library, and serves as a clearinghouse for researching waste reduction information.

DES Pollution Prevention Coordinator

Stephanie D'Agostino.....(603) 271-6398

Assists in the integration of Pollution Prevention concepts into Department functions and assists in overall coordination of the Department's pollution prevention efforts.

Small Business Technical Assistance Program

Rudy Cartier (Ombudsman).....(603) 271-1370

Provides free confidential technical assistance to help small businesses comply with Clean Air Act Amendment requirements.

DES Recycling Coordinator

Sherry Godlewski.....(603) 271-3712

Coordinates municipal recycling programs and maintains a database of recycling haulers, vendors, and markets, while also retains a library of solid waste recycling information including equipment files, product information.

NH Household Hazardous Waste Grant Program

Ken Stuart.....(603) 271-2047

Coordinates household hazardous waste collection programs, provides collection & disposal information for small volumes of wastes from small businesses.

OSHA Consultation Program

Theresa Ferrara/Brenda Clark.....(603) 271-4676

Provides free assistance for business with less than 150 employees. Helps businesses determine/correct workplace hazards and works to create programs to ensure a safe and healthy workplace.

WasteCap Program

Barbara Bernstein.....(603) 224-5388

A program operated by the Business & Industry Association of NH, provides on-site solid waste reduction assistance & information for businesses.

Hazardous Waste Compliance.....(603) 271-2942
Solid Waste Compliance.....(603) 271-2925
NH Division of Water Supply and Pollution Control.....(603) 271-3504
NH Division of Air Resources.....(603) 271-1370
NH Department of Health & Human Services.....(603) 271-4688
Governor's Energy Office.....(603) 271-2611

Office of State Planning.....(603) 271-2155

Additional Resources

NE Resource Recovery Association.....(603) 224-6996
Northeast Industrial Waste Exchange.....(315) 422-6572
EPA New England.....(617) 565-3715
RCRA/Superfund Hotline.....(202) 382-3000
(or toll free).....(800) 424-9346
N.E. Multi-Media Pollution Prevention Clearinghouse....(617) 367-8558
NH Industrial Research Center, Joe Paterno.....(603) 862-0123

U.S. EPA New England

Waste Management Division

Research Librarian for RCRA, Fred Friedman.....(617) 573-9687

Water Management Division

Ground Water, Michele Notarianni.....(617) 565-4940

Air Pesticides & Toxics Management Division

Toxics/General P2 Contact, Tom D'Avanzo.....(617) 565-4502
TRI & 33/50, Dwight Peavey.....(617) 565-3230

U.S. EPA Headquarters, Washington, D.C.

Office of Air & Radiation

MACT & VOC Standards, Jack Edwardson.....(919) 541-4003
Green Lights Hotline.....(202) 775-6650
Stratospheric Ozone Information Hotline.....(800) 296-1996

Office of Pollution Prevention & Toxics

33/50.....(202) 260-4572
TRI User Support.....(202) 260-1531
EPCRA Hotline (TRI Information).....(800) 535-0202
TSCA Hotline (33/50 Information).....(202) 554-1404

Office of Research & Development (HQ)

Center of Environmental Research Information(CERI)....(513) 569-7562
National Tech. Info. Searches, Public Searches.....(703) 487-4642

Office of Solid Waste & Emergency Response

RCRA Hotline (OSW Publications).....(800) 424-9346

Office of Water

Resource Center.....(703) 821-4823

Other Resources

Northeast Business Environmental Network.....(617) 354-1885
Waste Minimization Staff.....(513) 569-7529
Pollution Prevention Office.....(202) 245-3557
Small Business Ombudsman (SBO Hotline).....(800) 368-5888
National Pollution Prevention Roundtable.....(202)543-7272



Information and Technical Assistance Directory

RCRA Reporting

Carol Forest.....	(603)271-2921
Heidi Littlefield.....	(603)271-3203
Kathy Pelissier.....	(603)271-2921
Karen Way.....	(603)271-6350

For questions regarding specific reporting issues:

Annual/Biennial Reports-Karen Way or Heidi Littlefield
 Quarterly Reports-Kathy Pelissier
 Notification Forms-Carol Forest
 Subsequent Notifications-Heidi Littlefield
 Temporary/Provisional Identification Numbers-Kathy Pelissier or Carol Forest

Other NH Programs

Hazardous Waste Compliance.....	(603)271-2942
Special Investigations Section (includ. transporter issues).....	(603)271-3899
Solid Waste Compliance.....	(603)271-2925
NH Division of Water Supply & Pollution Control.....	(603)271-3504
NH Division of Air Resources.....	(603)271-1370
NH Dept of Health & Human Services.....	(603)271-4688
Office of State Planning (Toxic Release Inventory info).....	(603)271-2155

Additional Resources

USEPA Region 1 (aka USEPA New England).....	(617)565-3715
RCRA/Superfund Hotline.....	(800)424-9346
USEPA Region 1 Waste Management Division.....	(617)573-9687
USEPA Region 1 Water Management Division.....	(617)565-4940
TRI & 33/50.....	(617)565-3230



**STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION**

**6 Hazen Drive, Concord, New Hampshire 03301-6509
(603) 271-2942**

The following companies offer OSHA 1910.120 training as well as other courses in hazardous materials:

1. CON-TEST Educational Center
39 Spruce Street
East Longmeadow, MA 01028
Contact: Greg Morsch or Ed Rigney
(413) 525-1198 or 800 634-8165
2. Enviro Business, Inc.
701 Concord Avenue
Cambridge, MA 02138
Contact: Eric Newman or Erin Chute
(617) 868-4321
3. GZA Geoenvironmental
380 Harvey Road
Manchester, NH 03103
Contact: Dennis Francoeur
(603) 623-3600
4. HAZMATEAM
12 Kimball Hill Road
Hudson, NH 03051-3915
Contact: Leo Traverse
(603) 882-6247
5. Laidlaw Environmental Services Northeast, Inc.
221 Sutton Street
North Andover, MA 01845
Contact: Susan Kaiser
(508) 683-1002
6. Les A. Cartier and Associates, Inc.
PO Box 559
191 Main Street
Candia, NH 03034-0559
Contact: Diane A. Cartier or Les A. Cartier
(603) 483-2180
7. The New England Consortium
Work Environment Laboratory
University of Massachusetts - Lowell
1 University Drive
Lowell, MA 01854
Contact: Dalia Paradie
(508) 934-3257

8. Scott Lawson Group, Ltd.
29 River Road, Suite 18
PO Box 8304
Concord, NH 03302-3804
Contact: Gregory Stevenson
(603) 228-3610
9. HazMat Environmental Group, Inc.
60 Commerce Drive
Buffalo, NY 14218-1040
Contact: Patti Carey or Diane Wieszala
(716) 827-7200
10. Atlantic Environmental & Marine Services, Inc.
PO Box 773
Plymouth, MA 02362
Contact: James Brackett
(508) 747-6944
11. Nelson Environmental
PO Box 126
Fremont, NH 03044
Contact: Doug or Julie Graham
(603) 895-6403

The following companies do not offer OSHA 1910.120 training but do offer other hazardous material courses:

1. Lion Technology, Inc.
PO Drawer 700
Lafayette, NJ 07848
Contact: Susan Reilly
(201) 383-0800
2. Mabbett & Associates, Inc.
5 Alfred Circle
Bedford, MA 01730
Contact: Charles Hardenstine
(617) 275-6050
3. Pollution Solutions of Vermont
2 Avenue D
Williston, VT 05495
Contact: Chris Casiello
(802) 860-1200

The New Hampshire Hazardous Waste Rules require that all employees of hazardous waste generators be thoroughly familiar with proper waste handling and emergency procedures relevant to their responsibilities during normal facility operations and emergencies. Except for small quantity generators (as defined in New Hampshire's Hazardous Waste Rules), hazardous waste handlers are required to complete a training program which meets federal regulation set forth in 40 CFR 265.16 and 29 CFR 1910.120.

This is not a complete list of all training programs available, nor does it imply endorsement from the New Hampshire Department of Environmental Services.

NOTE: Many of the trainers with out-of-state addresses offer courses in New Hampshire.

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NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION

SUMMARY OF USED OIL REGULATIONS
as provided in New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000

The following is an outline of the State of New Hampshire's used oil regulations which are contained in "Part Env-Wm 807 - Requirements for Management of Used Oil Being Recycled".

A. Key Provisions

1. Used oil is a New Hampshire listed hazardous waste with a New Hampshire Hazardous Waste Number of NH01.
2. When used oil is recycled, i.e. burned for energy recovery or rerefined, it is subject to less stringent requirements.
3. Requirements apply to:
 - a. Generators
 - b. Transporters
 - c. Marketers
 - d. Burners
4. Household generators are exempt from these requirements.
5. Certain prohibitions pertain to the recycling of used oil.
 - a. Used oil shall not be used for road oiling or dust suppression.
 - b. Off-specification used oil shall not be used as an automotive undercoating.
 - c. Used oil shall not be mixed with any other hazardous waste.

B. Classification of Used Oils

1. Specification used oil must not exceed the following levels:

Arsenic	5 ppm max
Cadmium	2 ppm max
Chromium	10 ppm max
Lead	100 ppm max
PCB's	< 2 ppm
Total Halogens	1000 ppm max
Flash Point	100° F min

2. Off-specification used oil must not exceed the following levels:

Arsenic	18 ppm max
Cadmium	10 ppm max
Chromium	35 ppm max
Lead	1000 ppm max
Flash Point	100° F min

3. Used oil shall be classified as hazardous waste when:

- a. Mixed with a hazardous waste; or
- b. Exhibits a hazardous waste characteristic except as provided for above; or
- c. Exceeds off-specification levels.

4. Sampling and Analytical methods - must conform with SW-846 and be technically suited to analysis of used oil.

C. Standards for Generators (This includes municipalities that collect used oil from residents as a household waste.)

- 1. Must be stored in DOT approved containers or structurally sound tanks.**
- 2. Containers and tanks must be clearly labelled with the words "Used Oil for Recycle" at all times during accumulation and storage.**
- 3. Containers and tanks must be sealed at all times except when used oil is being added or removed.**
- 4. An initial used oil determination is required except for municipalities that collect used oil generated as a household waste and generators of used oil comprised solely of used automotive oil who then ensure the oil has not been mixed with any other types of oil or waste.**
- 5. Ensure delivery to a facility authorized to accept used oil or burn on site per Env-Wm 807.10.**
- 6. May self-transport up to 110 gallons to an authorized facility or contract with a NH registered hazardous waste transporter.**
- 7. A three copy Bill of Lading must accompany each shipment.**
- 8. Generators who deliver used oil directly to a burner shall comply with the Marketer Standards.**
- 9. Recordkeeping - copies of Bills of Lading and used oil analyses need to be kept on file for three years.**

D. Standards for Transporters

- 1. Be registered with the State of New Hampshire and meet all hazardous waste transporter requirements unless the generator is self-transporting (see C.6 above).**

2. Use a three copy Bill of Lading for each shipment.
3. Recordkeeping - copies of Bills of Lading must be kept on file for three years.

E. Standards for Marketers.

1. A used oil marketer includes the following:
 - a. Generators who market their used oil directly to a burner.
 - b. Persons who receive used oil from generators and who produce, process or blend the used oil.
 - c. Persons who take ownership of oil they collect and then distribute the oil.
2. Used oil marketer does not include the following:
 - a. Used oil generators, unless delivering directly to a burner.
 - b. Transporters who transport used oil received only from generators and who do not take ownership of the oil they collect.
3. Notification to Waste Management Division of used oil management activities.
4. Sampling and analyses for each batch of used oil being marketed.
5. A Bill of Lading is required for each shipment. Bills of Lading shall include the batch number and the specification of oil. A copy of the analyses must accompany the Bill of Lading.
6. Obtain a written notice from the recipient which certifies their used oil management activities.
7. Provide a written notice, prior to receiving oil from other marketers, which certifies that the receiving marketer has notified the Division of their used oil management activities.
8. Maintain an operating log.
9. Record Keeping - keep the following on file for 3 years.
 - a. Notices
 - b. Analytical reports
 - c. Bills of Lading
 - d. Operating log.

F. Burner Standards for Used Oil Fuel.

1. Notification to Waste Management Division and Air Resources Division of used oil management activities.
2. Off-specification used oil fuel shall only be burned in:
 - a. Industrial Furnaces
 - b. Boilers at a manufacturing site with >10 million BTU/hour capacity

Summary of NH Used Oil Regulations

Page 4

- c. Utility boilers
 - d. Used oil fired space heaters - if oil is only generated on site .
- 3. Specification used oil fuel shall only be burned in:
 - a. Oil furnaces and boilers, except at residential locations.
 - b. Used oil fired space heaters which produce < .5 million BTU/hour.
- 4. Perform analysis on the used oil unless:
 - a. Already tested by a marketer and a copy of report has been provided; or
 - b. Only burning used automotive oil that is generated on site; or
 - c. Only burning used oil collected from persons generating used oil as a household waste .
- 5. Prior to accepting off-specification used oil fuel from a marketer, provide a one-time notice that the burner has notified the Waste Management Division.
- 6. Recordkeeping - keep the following on file for 3 years.
 - a. Notices
 - b. Analyses
 - c. Bills of Lading

- * This summary provides general information only. Should there be additional questions, please contact the Department of Environmental Services, Waste Management Division (DES) at (603) 271-2942. For a complete description of the requirements, refer to New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000, which may be obtained by contacting the DES at 6 Hazen Drive, Concord, NH 03301. Telephone: (603) 271-2901.

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USED OIL GENERATOR INSPECTION CHECKLIST

Site Name: _____

Site Location: _____

Mailing Address: _____

EPA ID #: _____ (Gen, Mrk, Brn, Trans) Phone #: _____

Industry Representative(s): _____

Address Correspondence to: _____

Company President: _____

Property Owner: _____

Past Ownership & Activity: (years at site, name change, etc.) _____

No. of Employees: _____ No. of Shifts: _____ Shift Hours: _____

Prior Inspections: _____ Previous Enforcement Actions: _____

INSPECTION DATE: _____ DES Inspectors: _____

Lead Inspector's signature: _____

I. PRE-INSPECTION MEETING:

A. Facility Permits, Treatment/Disposal

Permits Issued: _____

Variances/Waivers: _____

Underground Storage Tanks: _____

1. Where does the facility receive its water supply? (well, town water, etc.): _____

2. Does the facility discharge to a sewer system? _____ If yes:

a) What POTW accepts the discharge? _____

b) What industrial wastes are discharged? _____

c) Is the facility in compliance with the local sewer ordinance? (Any analysis, etc.) _____

d) Are pretreatment standards (if any) met? _____

Used Oil Generator Inspection Checklist
page -2-

Site _____ Date _____ EPA ID# _____

3. Does the facility have any industrial discharges to a septic system or drywell? _____
4. Does the facility treat any wastes on site? _____
5. Does the facility have any transformers or capacitors on site? _____
 - a) How old are the transformers or capacitors? _____
 - b) Do they contain PCB's? _____
6. Does the facility have an Elementary Neutralization Unit/Wastewater Treatment Unit (ENU/WWTU)? _____

B. General Information (Process Description, etc.)

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Used Oil Generator Inspection Checklist
page -3-

Site _____ Date _____ EPA ID# _____

II. USED OIL MANAGEMENT

1. Is the used oil destined to be burned or rerefined? _____
2. Has a used oil determination been made? _____
[Env-Wm 807.06(b)(4)]
3. How is the used oil classified? (specification;
off-specification; automotive; hazardous waste) _____
4. How is the used oil stored? (containers or tanks) _____
5. DOT approved containers/structurally sound tanks? _____
[Env-Wm 807.06(b)(1)]
6. Are all containers and/or tanks marked with the words
"Used Oil for Recycle"? [Env-Wm 807.06(b)(2)] _____
7. Are the containers or tanks kept closed at all times
except when material is being added or removed? _____
[Env-Wm 807.06(b)(3)]
8. Is used oil transported by a registered transporter? _____
[Env-Wm 807.06(b)(8)]
9. Is the used oil self-transported in accordance with
Env-Wm 807.07? _____
10. Are records kept on file for three years? _____
[Env-Wm 807.06(b)(13)]
11. Is the used oil burned on site? _____

Used Oil Generator Inspection Checklist
page -4-

Site _____ Date _____ EPA ID# _____

III. BURNER REQUIREMENTS:

1. Is used oil burned in a space heater____; industrial furnace____;
industrial boiler____; other_____.
2. Type of oil burned is specification ____; off-specification____;
automotive____; household_____.
3. Is used oil received from off-site? _____
4. Has a used oil analysis been done? [Env-Wm 807.10(b)(5)] _____
5. Are records kept for three years? [Env-Wm 807.10(b)(7)] _____

IV. MISCELLANEOUS INFORMATION:

1. Are there any surface waters in the proximity? _____
2. Is there potential for an imminent hazard, air or water discharge
violation? _____
3. Were any photographs taken? _____
4. Other _____

V. POST INSPECTION MEETING:

Attended by: facility personnel-
DES personnel-

Review: _____

Information Provided to Facility:

Information Requested by Facility Date Sent

Information Requested by DES Date Received



Used Oil Generator Inspection Checklist
page -5-

Site _____ Date _____ EPA ID# _____

VI. SUMMARY OF VIOLATIONS OR DEFICIENCIES:

<u>Class:</u>	<u>N.H. Rule #:</u>	<u>Description:</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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**NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION**

"USED OIL FILTERS"

as provided in New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000

INTRODUCTION

Used oil filters represent a significant waste stream in New Hampshire resulting in the generation of approximately 1,750,000 filters in 1992. Although New Hampshire's position on used oil filters has remained consistent for a number of years, there are differences between State and Federal regulations which have significantly impacted the generator of used oil filters. To fully understand the requirements for managing used oil filters, it is essential that there be understanding of both the federal and state interpretations.

New Hampshire addresses used oil filters as per Env-Wm 401.03(b)(19), which states:

The following materials shall be exempt from regulation under the hazardous waste rules:

(20) Filter materials, including automotive oil filters, which are contaminated solely with used oil, provided that the filter materials have been purged of used oil as completely as is practicable. In the case of automotive oil filters, gravity draining of the filters over a container for at least 1 hour shall be deemed to be sufficient purging for the purpose of this exemption.

Prior to May 20, 1991, the Federal ruling stated that all oil filters were subject to a waste determination, which included the Toxicity Characteristics Leachate Procedure test (TCLP). Since, New Hampshire was less stringent than EPA, a generator could be held in violation of Federal rules by EPA even though they may be in compliance with state requirements. Thus, New Hampshire DES recommended to all generators that they comply with the U.S. EPA requirements.

However, on May 20, 1991, the U.S. EPA passed an exemption which eased requirements for used oil filters, and cited studies demonstrating that the vast majority of the filters successfully passed the TCLP test. Oil filters could now be disposed of as solid waste, without a waste determination, provided that the oil was removed prior to disposal. A waste determination would now be required for only lead plated (Terne) filters, which are not subject to this exemption.

To meet this exemption, EPA required the oil be removed by a suitable method, such as hot draining, crushing, puncturing of the anti-drain valve, and any other method deemed equivalent. This is more in line with the current New Hampshire rule which still requires a draining period and is presented

Used Oil Fact Sheet
page 2

above. Although EPA did not specifically require any one method, DES strongly recommends that the practice of crushing be employed, as the process appears to be the most efficient for oil removal, and also prepares the filter cartridge for recycling activities.

DES also strongly advocates the recycling of used oil filters. Currently, this involves delivery of the used oil filter to an approved recycler who will recycle the scrap metal and separate the filter material. The generator is responsible for properly draining the filter unless the recycler has agreed to do the drainage prior to recycling. If you have lead plated (terne) filters, the scrap metal recycling process will exempt you from the federally required waste determination, as it has done in the former rule. Note: According to EPA, the presence of lead based filters is at best infrequent and lessening with time as many manufacturer no longer produce the item. However, if you are concerned that your filter may indeed be lead plated, check the model number on the filter and contact the manufacturer for a determination.

In summary, used oil filters can be disposed of in New Hampshire as solid waste, provided the oil is removed as much as is practical and the filter is disposed of at a permitted solid waste facility. Lead plated filters are subject to a full hazardous waste determination, including testing requirements, and must be managed accordingly. Generators should note that there may be instances where the Federal EPA is still more stringent than the State requirements, and all generators are urged to consult with the State and Federal requirements with their own particular situation. The general number for the U.S. EPA, Region I (617)-565-3420.

This summary provides general information only. Should there be additional questions, please contact the Department of Environmental Services, Waste Management Division (DES) at (603) 271-2942. For a complete description of the requirements, refer to New Hampshire's Hazardous Waste Rules, Env-Wm 100-1000, which may be obtained by contacting the Department of Environmental Services, Public Information and Permitting Unit, 6 Hazen Dr., Concord, NH 03301-6509. Tel: (603)-271-2975.

APPENDIX D

HAZARDOUS WASTE MANIFEST DESIGNATIONS AND SIGNATURE POLICIES

The project manager should insert the training records and the formal written designation and authorization from the Division Commander for those individuals authorized to sign hazardous waste manifests at the project.



US Army Corps
of Engineers

Construction Bulletin

No. 93-6 Issuing Office: CEMP-CP Issue Date: 5/4/93 Exp. Date: 31 DEC 95

CEMP-C

Subject: Hazardous Waste Manifest Signature Policy and Procedures

Applicability: DIRECTIVE

1. REFERENCES.

a. Construction Bulletin No. 91-13, 3 Jul 91, subject: Preparation and Signature of Hazardous Waste Manifests and Land Ban Certifications on EPA Superfund Projects.

b. Construction Bulletin No. 91-21, 27 Nov 91, subject: Signature of Hazardous Waste Manifests for EPA Superfund Projects.

c. Construction Bulletin No. 92-1, 29 Jan 92, subject: Asbestos Notification and Waste Shipment Record Requirements.

d. ER 1180-1-6, Construction Quality Management, 1 Apr 91.

e. ER 1110-1-263, Chemical Data Quality Management for Hazardous Waste Remedial Activities, 1 Oct 90.

f. CEMP-RF memorandum dated 30 Apr 93, subject: Signatory Responsibility for Hazardous Waste Manifests and Related Documents - Policy Guidance.

2. PURPOSE.

This Construction Bulletin (CB) establishes policy regarding the signing of hazardous waste manifests and related documents. The Resource Conservation and Recovery Act (RCRA) addresses the "cradle to grave" management of hazardous waste. This includes the generation, storage, treatment, transportation and disposal of hazardous wastes. Implementing regulation (40 CFR 262) requires a generator who transports, or offers for transportation, hazardous waste for offsite treatment, storage, or disposal to prepare and sign a manifest which describes the hazardous waste in detail.

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3. GENERAL.

With the exception of Corps owned facilities, USACE is not considered to be the owner of the hazardous waste it transports as part of the response activities. The customer agency is the generator for purposes of executing hazardous waste manifests. However, due to logistic complexities, a customer may not be able to provide an individual to sign the hazardous waste manifests in a timely manner. The customer may then request the Corps to sign project manifests on their behalf. (Federal regulations permit generators to have agents act on their behalf in signing the manifest forms). When an individual is signing on behalf of a generator which is a legal entity, such as a corporation or a company, the words "on behalf of" should be entered to indicate that the person signing the Generator's Certification is not necessarily accepting liability for violating the federal standards.

4. POLICY.

a. As the leader in DOD's full service environmental restoration efforts, USACE's role is expanding as a result of legislation, evolving missions, and customer needs. Commensurate with this role, it is USACE's goal to develop and implement practices that will facilitate the continuation of quality, comprehensive environmental services. In keeping with this goal, it is USACE's policy, if requested by its customers, to execute on behalf of those customers hazardous waste manifests and related documents. So far, two of our customers have requested USACE assistance in signing manifest forms on their behalf: the Environmental Protection Agency (EPA) and the Farmers Homes Administration. HQUSACE has accepted the delegated responsibility.

b. With regard to manifesting activities at sites where USACE is the owner or responsible agency, e.g., Civil Works facilities or Defense Environmental Restoration Program (DERP)-FUDS, manifest execution and related responsibilities will be performed by USACE.

c. With regard to DERP-Installation Restoration (IR) and Base Realignment and Closure (BRAC) environmental restoration activities, manifest execution and related responsibilities ordinarily belong to the customer (i.e., the installation or the base).

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In those instances where the additional cost of sending a qualified USACE representative to a remote location for a small project is unwarranted, the option of requiring the contractor to sign the manifests is permitted and should be considered. This option can only be exercised on a project specific basis after written authorization of the customer and approval of the Chief, Construction Division at the executing district. For FUDS projects, only the approval of the Chief, Construction Division at the executing district is necessary. In all cases, this requirement (of having the contractor sign the manifest) must be incorporated in the contract solicitation prior to contract award.

5. PROCEDURES.

Where USACE personnel execute Uniform Hazardous Waste Manifest forms and related documents, procedures will be adopted by the operating divisions or districts as follows:

a. In the Generator's Name and Mailing Address box (block #3) on the Uniform Hazardous Waste Manifest form, Corps authorized personnel shall enter the following information: "Environmental Protection Agency/Superfund Program", "Farmers Homes Administration", or "DOD (DERP/FUDS)" as appropriate followed by "c/o" and then the name and address of the Corps office that manages the returned manifest forms. In the generator's certification box (block #16), the Corps employee would then sign his or her name, followed by "USACE" after writing or printing the phrase "On-behalf of the Environmental Protection Agency" or "On behalf-of the Farmers Homes Administration" as appropriate. On FUD sites, Corps personnel should follow the same procedure after typing or printing the phrase "On behalf-of the Department of Defense". All other manifest related documents executed by USACE members on behalf of a customer shall be executed by signature followed by USACE after writing or printing the phrase "on behalf of the (name of the customer)".

b. On Corps owned facilities where the Corps is a "generator" of hazardous wastes or is the "Responsible Party", Corps personnel shall enter in block #3 on the manifest form "U.S. Army Corps of Engineers", followed by the name and address of the Corps office that manages the returned manifest forms. In the generator's certification

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box (block #16), the Corps authorized employee would sign his or her name after typing or printing the phrase "On behalf of the U.S. Army Corps of Engineers".

c. Corps personnel authorized to execute manifest forms and related documents shall assure compliance with all reporting requirements (e.g., exceptions reports, biennial reports and state reports) as well as follow-on requirements, including the assembly and retention of all appropriate documentation and certifications.

d. Assure that USACE is authorized by its customers to execute hazardous waste manifests and related documents on their behalf before such documents are executed. This authorization is effected through an explicit provision in a Memorandum of Agreement, Inter-Agency Agreement, or correspondence signed by an appropriate agency official* requesting and authorizing USACE to sign on their behalf. The customer request and authorization must acknowledge that the customer retains all responsibilities for the hazardous waste as a generator. This shall extend to the execution of the Hazardous Waste Manifests, Land Disposal Restriction Notification and Certifications, Waste Profile Sheets, and other forms necessary for the completion of manifests for transportation and disposal of hazardous waste. Approval to undertake the delegated responsibility of signing manifest forms and related documents rests with the chief of Construction Division at the executing district. If state statutes or regulations do not permit USACE to sign such documents on behalf of the customer, the Resident Engineer (RE) or other designated USACE representative is to contact the customer for further guidance.

e. All USACE members executing hazardous waste manifests and related documents must receive appropriate training before executing such documents. The minimum required training is specified in the following regulations:

* HQUSACE Office of Counsel advised that EPA's letter of 18 Oct 90 (see reference 1a) requesting and authorizing USACE to execute and certify manifest forms and related documents on their behalf is legally sufficient and that no further documentation or individual project authorization is necessary.

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(1) Occupational Safety and Health Act (OSHA), 29 C.F.R. 1910-120;

(2) Resource Conservation and Recovery Act (RCRA), 40 C.F.R. 264.16 and 40 C.F.R. 265.16;

(3) Hazardous Transportation Uniform Safety Act (DOT), 49 C.F.R. 173.1; and May 15, 1992 Final Rule, Federal Register 49 C.F.R. 172.700 (Subpart H-Training); and

(4) Army Regulatory training requirements (AR 55-355).

Additional training may be required by operating divisions or districts. Training can be obtained from within or outside USACE. Regardless of the training source, it is the responsibility of the employing division or district to assure that the training is appropriate and that records of the members' successful completion of the training are appropriately maintained.

f. Only USACE members formally designated and authorized by a division or district commander/deputy commander shall be allowed to execute hazardous waste manifests and related documents. The formal designation and authorization must be in writing and state that the member is within his/her scope of employment when executing such documents.

g. Where USACE members are executing hazardous waste manifests and related documents, the contract under which the removal or remediation is being performed must contain supporting chemistry-related requirements and procedures. These items are imposed by the specifications and addressed by the contractor in a document known as the "Chemical Data Acquisition Plan" (see reference 1e). These plans are site specific guidance for sampling and analyses. They address, among other things, laboratory activities, chemical data documentation, equipment, sampling documentation, quality control, sample custody and shipment, analytical methods and document preparation. The project specific supplement to the QA Plan, developed by the Resident Engineer in accordance with reference 1d, must define the USACE quality assurance role in the manifesting process.


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h. It is intended that future contracts shall contain a requirement that hazardous waste manifests and related documents executed by USACE members be supported by contractor submittals prepared, reviewed, and approved by an authorized representative of the contractor. The contractor's employee shall also certify that packaging, labeling, marking and placarding of the waste meet all applicable federal and state regulations, and shall also certify as correct, Land Disposal Restriction Notifications and Certifications, Waste Profile Sheets, and related documents before providing the documents to USACE.

6. To implement the above policy and procedures, HQUSACE (with MRD MCX support) is defining the responsibility of and the course of action to be followed by all parties involved, i.e., HTRW design districts, executing districts and contractors. A complete hazardous waste transportation and disposal check list will be developed for contractors to complete as part of the submittal process. For your information, the Engineer Manual on manifesting is projected to be complete by end of this fiscal year. Previously issued CB's provided you with recommended training sources, Hot Lines, and videotape libraries to assist you in accomplishing your mission.

7. This CB has been coordinated with HQUSACE's Environmental Restoration Division (CEMP-R); Engineering Division (CEMP-E); Office of the Chief Counsel (CECC-C); Office of the Principal Assistant Responsible for Contracting (CEPR-ZA); and, Operations, Construction and Readiness Division, Directorate of Civil Works (CECW-OC).


CHARLES R. SCHROER
Chief, Construction Division

25 AUG 1993

CECW-OA

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Hazardous Waste Manifest Signature Policies and Procedures

1. References:

a. Department of Transportation Regulation 49 CFR 172.700 (Subpart H-Training).

b. Construction Bulletin 93-6, subject as above (enclosed).

2. It is Civil Works and Military Programs policy with regard to manifesting activities at sites where the U.S. Army Corps of Engineers is the owner or responsible agency, that manifest execution and related responsibilities will be performed by the Corps.

3. Department of Transportation regulation 49 CFR 172.700 (Subpart H-Training) requires training employees who load, unload, or handle hazardous materials for transportation, assure the safety of a shipment, or operate a motor vehicle used to transport hazardous materials.

4. Construction Bulletin 93-6, paragraph 5e., requires that all Corps members "executing" hazardous waste manifests and related documents must receive appropriate training before executing such documents. Completion of training is required by 1 October 1993, for employees employed on or before 2 July 1993.

5. Only Corps members formally designated and authorized by a division or district commander/deputy commander shall be allowed to execute hazardous waste manifests and related documents. The formal designation and authorization must be in writing and state that the member is within his/her scope of employment when executing such documents.

CECW-OA
SUBJECT: Hazardous Waste Manifest Signature Policies and
Policies

6. Headquarters point of contact is Jim Wolcott (CECW-OA), at
(202)272-1152.

ENCL

/5/
JOHN P. ELMORE, P.E.
Chief, Operations, Construction,
and Readiness Division
Directorate of Civil Works

APPENDIX E

RECYCLING INFORMATION

ENVIRONMENTAL Fact Sheet



NHDES Technical Bulletin

#WMD-1993-15

RECYCLING NEWSPAPER

Newspaper in Solid Waste

Weight and Volume – About 13 million tons, or 26 billion pounds, of newspaper were discarded in the U.S. in 1990, or about 7.5% of U.S. Municipal Solid Waste (MSW). By volume, newspaper constitutes approximately the same percentage of MSW. About 90% of all newspaper is discarded with residential wastes, so that newspaper constitutes nearly 10% of the residential waste stream. Commercial and industrial sources contribute the balance of newspaper discards.

Disposal – Newspaper is readily degradable in soil or compost. Like all materials, however, newspaper degrades very slowly in landfills, because they exclude the oxygen and moisture required for biodegradation. Newspaper burns well in waste-to-energy incinerators, producing little ash (under normal operating conditions). Newspaper has about 7,500 British Thermal Units (BTU) per pound (a measure of the heat released on combustion), compared to about 4,500 BTU/pound for mixed MSW. Until recently, many newspaper inks contained lead and other hazardous constituents, generating environmental concerns for both landfill and incinerator disposal. These toxic constituents have been rapidly phased out, however, with the result that they now pose little or no concern.

Newspaper Recycling

Collection, Processing, and Storage – Along with scrap metal, newspaper is a commodity with a very long recycling history. For decades, local organizations raised funds by collecting and selling newspaper to wastepaper brokers. Currently, it is estimated that over half of all newspapers consumed in the United States are recycled. New Hampshire's estimated recycling rate (for 1992) is much lower, about 25%, in spite of the fact that over 90% of New Hampshire residents have access to curbside or dropoff newspaper recycling.

Wastepaper brokers recognize many different grades of newsprint ("newsprint" is the paper itself; "newspaper" is the printed product). Most communities recycle either a "Number 6" blend, which can contain significant volumes of other papers (e.g., brown shopping bags), or "Number 8 news," which has higher quality specifications. The prices paid by brokers vary by grade – grades with a smaller proportion of mixed papers or other contaminants receive higher prices.

Newsprint can be marketed either baled or unbaled; baled product is easier to handle, and generally commands a higher price. Contamination with food, broken glass, moisture, or other foreign materials is a concern for recyclers. In addition, newspaper deteriorates with prolonged storage or exposure to sunlight, with the result that it must be moved to markets relatively quickly.

Manufacturing – Newspapers are readily recyclable, and can be remanufactured back into newsprint or into any of a number of other papers (e.g., boxboard, newsletter stock). Newspapers that are reprocessed into new newsprint are "deinked" using one of two common technologies (flotation or washing). Although recycled newsprint has many desirable characteristics (e.g., flexibility, good opacity, resistance to temperature and humidity changes), the recycling process tends to reduce average fiber length (which largely determines the strength of finished papers), with the result that some virgin pulp is needed for almost all newsprint production. Environmentally, recycling processes also consume less energy and water than virgin paper manufacture, generate smaller releases to air and water, and require less severe bleaching.

In addition to remanufacturing into paper, newsprint can be reprocessed into many other products. These include, for example, insulation, tarpaper, roofing shingles, and animal bedding. One manufacturer in New Hampshire produces blown insulation from recycled newsprint, while a number of New Hampshire farmers use shredded newsprint for animal bedding. Mixed with manure, this newspaper is ultimately either composted or spread directly onto fields and pastures.

Markets for Recycled Newspaper – Prior to the late 1980s, markets and prices for recycled newspapers were strong. Since then, however, local recycling programs have proliferated, while end use markets for recycled newsprint have been slow to expand. As a result, many markets have experienced "gluts," and recycling programs have sometimes been forced to pay tipping fees to move recycled newsprint to processors and manufacturers.

Very recently, however, much new manufacturing capacity for recycled newsprint has come on line, as manufacturers have responded to both the large available supplies of recycled newspapers and to increasing demand for recycled newsprint. A significant factor in this new demand growth has been a large number of legislative mandates and public/private voluntary agreements to expand recycled newsprint consumption. New Hampshire has been a leader in this area; in 1990, New Hampshire's eight daily newspapers signed a voluntary agreement with the state to consume increasing quantities of recycled newsprint, culminating with a 40% recycled fiber target by the year 2000. With this and similar agreements in place, it is predicted that markets for recycled newspapers will be strong through the 1990s, and that demand may begin to outgrow supplies in some regions.

For More Information

Additional information on recycling newspaper and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

ENVIRONMENTAL Fact Sheet



NHDES Technical Bulletin

#WMD-1993-16

RECYCLING CARDBOARD

Cardboard in Solid Waste

Weight and Volume -- Cardboard is the largest single constituent of Municipal Solid Waste (MSW). The U.S. Environmental Protection Agency (EPA) estimates that nearly 30 million tons of cardboard containers were generated as waste in 1990; this was nearly 12 percent of all U.S. MSW. Businesses are by far the largest sources of cardboard; cardboard accounts for almost 30% of all commercial and industrial solid waste, and business sources generate 90% of all of all cardboard waste nationwide. Cardboard is only about 2% of residential solid waste.

Cardboard is also one of the most frequently recycled materials in MSW. EPA estimates that nearly 50% of cardboard waste is currently recycled, with the result that cardboard accounts for less than 8% by weight of MSW that is disposed of. By volume, cardboard also accounts for approximately 8% of all MSW disposed of in the U.S.

Disposal -- Cardboard is free of toxic or other hazardous constituents that might pose environmental or health concerns upon disposal. Cardboard is biodegradable, although (like all materials) it degrades very slowly in the moisture- and oxygen-depleted landfill environment. Cardboard can be safely composted, and is used as a bulking agent in some leaf and yard waste, manure, and sludge compost operations. Cardboard is a valued addition to the mix of fuels combusted in waste-to-energy facilities, releasing about twice as much heat per pound as mixed MSW, and producing little ash.

Cardboard Recycling

Collection, Processing, and Storage -- The majority of cardboard recycled in the U.S. is collected and processed on-site by medium and large commercial establishments, including, for example, retailers (e.g., K-Mart, Sears), supermarkets, and other businesses with active shipping and receiving operations. In addition, many private waste haulers (and some municipal solid waste programs) offer separate pickup of cardboard to their commercial accounts. Because it is a small component of residential solid waste, not all municipal recycling programs accept cardboard. In New Hampshire, cardboard is recycled by about three-fourths of the state's municipalities. Cardboard is typically not one of the commodities targeted by curbside recycling programs (unless as a constituent of mixed paper).

Although cardboard can be marketed loose, it is almost universally baled before it is shipped to markets. Many businesses operate their own balers; malls and shopping centers frequently operate balers that are shared by a number of businesses. Before and after baling, moisture is the contaminant of most concern to cardboard recyclers. In addition, "Asian cardboard" -- an inferior corrugated

product manufactured from low quality recycled fibers and/or rice fibers -- can be a serious contaminant in recycled cardboard loads. (Asian cardboard is generally found as packaging for articles imported from China and Korea. It can be distinguished from higher quality cardboard by its flimsiness and characteristic pale brown or greenish color.)

Manufacturing -- Cardboard is a high-quality paper product characterized by long fibers and high strength. As such, it can be used as an input to manufacture a wide variety of recycled paper products, including (for example) new cardboard, printing and writing papers, paper- and boxboard, paperboard tubes, cans, and drums, and many others. In a typical remanufacturing process, recycled cardboard is dropped into a water-based solution in which it dissolves, contaminants (tape, staples, dirt, etc.) are removed by gravity, flotation, or filtration, the recycled pulp is blended to produce a mix with the characteristics required for production of a specific paper product, and the pulp is pumped to a paper machine on which the final product is manufactured. Additional operations may include deinking and/or bleaching. Environmentally, paper production from recycled cardboard consumes less energy, produces fewer emissions to air and water, and generates less solid waste than production of similar products from virgin fiber.

Markets for Recycled Cardboard -- Historically, markets for recycled cardboard have been strong, and per-ton prices have been among the highest paid for all recycled papers. In the past few years, however, cardboard demand and price have been affected by a nationwide glut of paper in recycling markets (associated with the proliferation of municipal recycling programs). Markets have been soft, and prices have dropped to a fraction of their historical averages. Very recently, manufacturers have begun to bring new mill capacity on line for all recycled paper grades, and prices and demand have stabilized. In the short term, demand and price may continue to fluctuate as markets adjust to new supplies and new production capacity; in the long term, however, the underlying value of recycled cardboard should reassert itself, demand should stabilize, and prices should rise toward their historical norms.

Although New Hampshire has several paper mills that use recycled cardboard, they consume only a small proportion of the supplies generated in the state. Most cardboard generated in New Hampshire moves through in-state or out-of-state brokers into regional paper markets. Two factors that impact marketing of recycled cardboard in New Hampshire are (1) the state's dispersed sources of cardboard waste, and (2) long distances to major end-use markets; both have a negative impact on the economics of recycling cardboard in New Hampshire, and tend to keep some generators from diverting their cardboard into recycling markets.

For More Information

Additional information on recycling cardboard and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

ENVIRONMENTAL Fact Sheet



NHDES Technical Bulletin

#WMD-1993-17

RECYCLING OFFICE WASTE PAPER

Office Waste Paper in Solid Waste

Weight and Volume -- The term "office paper" covers a wide variety of paper grades, including papers as diverse as computer printout paper, high quality printing and writing papers, and file stock (e.g., 3x5 cards, file folders). Approximately 6.4 million tons of office paper were generated as waste in the United States in 1990, or about 3% of all Municipal Solid Waste (MSW). Three-fourths of office paper is generated by commercial sources; nationwide, office paper constitutes 6-10% of the commercial solid waste stream. The balance of office paper is derived from residential sources. For some businesses (e.g., lawyers, engineering firms), office paper is the largest single component of solid waste. By volume, office paper also comprises about 3% of MSW.

Disposal -- With very rare exceptions, office paper is free of toxic or other hazardous constituents that might pose environmental or health concerns upon disposal. Office paper is biodegradable, although (like all materials) it degrades very slowly in the moisture- and oxygen-depleted landfill environment, and can be safely composted. Office paper is a valued addition to the mix of fuels combusted in waste-to-energy facilities, releasing nearly twice as much heat per pound as mixed MSW, and producing little ash.

Office Paper Recycling

Collection, Processing, and Storage -- In most municipalities in New Hampshire (and elsewhere), commercial and industrial solid wastes are not handled by municipal waste management programs. Typically, businesses contract with private haulers for solid waste collection and disposal. For this reason, office paper is generally not targeted by municipal recycling programs. In New Hampshire, only a handful of communities accept office paper for recycling.

However, because of its generally high value, office paper is an easily recyclable commodity. Recycling options are available to most businesses through private haulers, recycling processors, or paper brokers, and many businesses can realize significant waste management savings (and, in some cases, a significant revenue stream) by diverting waste paper from disposal to recycling. Many buyers will provide a regular pickup service for customers who generate large wastepaper volumes. Smaller businesses can either stockpile paper to accumulate a volume sufficient to market, or coordinate with other businesses to consolidate paper into quantities large enough to attract a buyer. A large local business with regular paper pickup may be willing to serve as a dropoff point for paper generated by smaller firms. Material recovery facilities (MRFs) and waste processors often accept office paper delivered to their facilities.

In all cases, collection and processing considerations are similar: paper must meet the material specifications established by the buyer; contaminants (tape, paper clips, etc.) must be excluded according to the buyer's requirements; and the paper must be kept dry and out of the sun. Because of the wide mix of papers generated by different businesses, and the similarly broad range of paper grades recognized by brokers and mills, it is particularly important to establish specific arrangements with a buyer regarding the mix of papers that will be collected. For example, a business may arrange to collect one mix of printing, copying, and computer papers for which it receives significant income, and a second "mixed paper" stream of post-it notes, envelopes, file stock, and other papers for much smaller revenues.

Manufacturing -- Most office papers are high-quality products characterized by long fibers and high strength. In addition, many office papers are brighter than newspaper and packaging paper grades, and so can be remanufactured without additional bleaching. Office papers can be used as an input to manufacture a wide variety of recycled paper products, including (for example) tissue and paper towels, printing and writing papers, boxboard, and containerboard. Until recently, laser-printed papers (including xerox copies) were difficult to recycle because of the tight bond between paper fibers and the chemical toner; new deinking technologies have largely overcome this problem, however, and high quality laser-printed papers are now among the most sought after recycled papers. Environmentally, paper production from recycled fiber consumes less energy, produces fewer emissions to air and water, and generates less solid waste than production of similar products from virgin fiber.

Markets for Recycled Office Paper -- Regional markets for recycled paper are well established, and prices are generally stable. In late 1993, prices paid by processors ranged above \$150 per ton for high quality papers, providing a significant economic incentive to recycle. Revenues are much less for mixed paper grades, but market stability and savings in tipping fees often provide sufficient incentive to recycle mixed paper as well. In the Northeast, new mill expansions may outstrip current office wastepaper supplies, leading to additional demand and continuing price improvement.

A critical factor in recent market growth for recycled office paper (and other recycled fibers) has been a growing number of public and private sector commitments to purchase recycled paper. Under a 1993 law and an Executive Order signed by Governor Merrill, the State of New Hampshire will purchase only paper with 10% post-consumer recycled fiber, and 50% total recycled content, starting in January, 1994. The State and private sector representatives are also developing a statewide "Buy Recycled Challenge" to encourage additional recycled paper purchases by New Hampshire's business community. Another DES fact sheet, "Buying and Using Recycled Paper," provides additional information on the importance of "buying recycled" and the differences between virgin and recycled papers.

For More Information

Additional information on recycling office waste paper and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

ENVIRONMENTAL Fact Sheet



NHDES Technical Bulletin

#WMD-1993-18

BUYING AND USING RECYCLED PAPER

The Importance of Buying Recycled

It is impossible to overstate the importance of buying recycled products to the success of recycling programs in New Hampshire and nationwide. It is straightforward for a community to set up a recycling program and start to collect materials from the waste stream. However, if there are no buyers -- no markets -- for those materials, they will pile up at local transfer stations until there is no room left to store them, or until they degrade from exposure to light and moisture, and then they will be trucked off to a landfill or incinerator. The key to establishing markets for recycled materials is consumer demand -- the decision, by millions of individual consumers, to seek out and purchase products with recycled content. Quite simply, if you're not buying recycled, you're not recycling.

This is particularly true for paper. For many materials (for example, aluminum and steel cans and glass bottles), markets for recycled raw materials are well established, and the economics of production drive manufacturers to consume as much recycled raw material as they can find. It is also impossible to distinguish between a "recycled" steel can (for example), and a can made from virgin steel -- the products are one and the same. For paper, however, recycled products compete directly against similar products manufactured from virgin materials, and consumers have explicit choices about the recycled content of products they purchase. Consumers also have the ability to influence manufacturers' decisions about using recycled paper -- for example, by expressing their preference for newspapers, books, magazines, paper towels, and other products with recycled content. For all types of paper, buying and using recycled paper is the key to successful recycling.

Manufacturing Pulp and Paper

Pulp- and Papermaking -- To understand recycled paper, one must understand how paper is made. Paper is manufactured in two distinct operations: pulpmaking and papermaking. The raw material for pulpmaking is a fiber source: whole trees or recycled paper (or, very rarely, sawdust, rags, rice, or another fibrous material). Pulp mills physically and chemically break these materials down into a watery slurry of fibers and dissolved chemicals. This slurry -- pulp -- is the end product of pulpmaking, and the raw material for papermaking. To manufacture paper, pulp is spread onto rollers at the "head end" of a paper machine. It is then carried through a series of screens and more rollers where it dries to become a finished paper. Along the way, it may be tinted, coated, or otherwise manipulated to produce a paper with desired characteristics. There are many "integrated" pulp and paper mills which produce pulp that is used in an attached paper machine. However, there are also many pulp mills which produce pulp for sale to papermakers in regional or national markets, and there are many freestanding paper mills that purchase "market pulp" to produce their products. Nationwide,

there are many more paper mills than pulp mills, producing an almost unlimited variety of papers from a smaller number of virgin and recycled pulps.

Recycled Pulp -- To produce a recycled pulp, waste paper is dumped into a large mixing vat ("pulper") containing a solution of chemicals that loosen the bonds between paper fibers and begin to remove inks. Different papers are mixed to produce pulps with specific characteristics. Contaminants (rubber bands, staples, etc.) are removed by gravity or filtration, and (if necessary) the pulp is deinked and/or bleached. Deinking of printed papers is accomplished by washing or "flotation." Washing uses chemicals and mixing action to lift ink particles and other coatings from the paper fibers, while flotation employs a bath of small air bubbles to separate coatings from fibers. Flotation is effective in removing the toners on laser printed and xerox copies; these papers are difficult to deink by washing, and had little value in recycled fiber markets before flotation technologies were developed. Once washed and deinked, recycled pulp is handled exactly like virgin pulp -- pumped, spread onto a paper machine, and rolled into a dry paper product.

Virgin Pulp -- By contrast, virgin pulp mills start with whole trees, and use one of two processes -- chemical or groundwood pulping -- to produce pulp. In a chemical pulp mill, trees are shredded into small (about 2-inch) chips which are heated under pressure in a solution that dissolves the natural chemical glues that hold the wood fibers together ("lignin," "hemicellulose," and other compounds). The chip mixture is released explosively from the pressure vessel, and the chips dissolve into a slurry of wood fibers, pulping chemicals, and liquified natural wood chemicals. The slurry is washed to remove the pulping chemicals (which are recycled and reused) and most of the natural liquids; the remaining solution is frequently bleached to increase brightness and destroy remaining organic compounds (which reduce paper quality). The fiber slurry, now a finished pulp, is either dried for sale to paper manufacturers, or pumped directly to a paper machine.

The groundwood process (which produces newsprint, directory stock, and similar papers) is quite different. Whole trees are moistened and mechanically ground up by large rollers, releasing the fibers into a water-based slurry with most of the wood chemicals (lignins and others) still intact. After washing and bleaching, this slurry is pumped directly to a paper machine. Most of the chemical constituents of wood are carried into the final paper product along with the wood fibers, where they tend to reduce strength and durability -- this is a distinguishing characteristics of groundwood papers.

Papermaking from Recycled and Virgin Pulps -- Much of the "art" of papermaking consists of blending pulps to produce papers with specific characteristics. Among the many sources of variation in pulps are: hardwood vs softwood fiber sources; the nature and severity of pulping and bleaching processes; and the nature and proportions of recycled fibers that are incorporated. The paper industry has used recycled fiber since its earliest days, and recycled and virgin pulps can be mixed in wide proportions to manufacture recycled papers. By the mid-1980s, before the proliferation of municipal recycling programs, recycled fiber already accounted for about a quarter of the papermaking inputs in the U.S.

Historically, most recycled paper has been used in lower-quality papers, including, for example, tissues, boxboard (e.g., cereal boxes), gypsum wallboard facing, thick-walled tubing, and pressed pulp products (e.g., egg cartons). Within the past ten years, however, a number of forces have combined to increase the use of recycled fiber in all paper grades -- these have included technical developments in pulping, deinking, and papermaking processes, increasing public and regulatory pressure concerning the environmental impacts of virgin pulp operations, increasing low-cost supplies of recycled fibers, and increasing demand for recycled fiber content in all papers.

Currently, products with recycled fiber content are available in almost all paper grades. Some papers continue to be produced with high recycled content as a matter of course; these include paper towels, tissues, boxboard, and related products. Manufacturers typically do not advertise the recycled fiber content of such products, and buyers may be completely unaware that they are purchasing a "recycled" paper. In many other grades, however, recycled papers compete with products manufactured from virgin pulps. In most writing, copying, and printing grades, for example, recycled content papers are now widely available, giving consumers and businesses a variety of options to "buy recycled." While there are few or no differences in the performance of virgin and recycled content papers in most applications (e.g., laser printers, letterhead, magazine stock), some consumers and business purchasers harbor lingering apprehension about the performance or quality of recycled papers, and recycled papers still command a price premium in some regions and paper grades.

Energy Use and Environmental Releases -- The majority of environmental releases in the pulp and paper industry come from pulping. The environmental impacts of papermaking are much smaller, and it is impossible to distinguish between the impacts from virgin and recycled papermaking. In pulpmaking, however, the differences are large. Compared to virgin pulping, recycled pulping consumes much less energy and generates smaller releases to air, water, and solid and hazardous waste streams. Virgin pulp mills recycle and reuse most pulping and bleaching chemicals, and use many process wastes in-house (for example, they burn bark, wood scraps, and wood chemicals to produce steam and electricity). Nonetheless, the sheer scale of pulpmaking operations, and the harsh nature of many pulping and bleaching processes, makes them the source of significant impacts to all environmental media. Recycled pulp operations, on the other hand, bypass the most energy-intensive and environmentally harsh steps in the pulpmaking process, and so are able to produce pulp at a smaller energy-use and environmental cost. The processes used in recycled pulping operations -- washing and deinking -- use relatively benign chemicals, and are not the source of major environmental impacts.

Buying and Using Recycled Paper

"Pre-Consumer" vs "Post-Consumer" Recycled Fiber -- This can be a critical distinction in the definition of recycled paper (and other recycled products). "Post-consumer" fiber is derived from products that have been purchased and used by their ultimate consumers (individuals and businesses) and recycled through municipal or private sector recycling programs. For most of the public, this is the accepted definition of "recycled." "Pre-consumer" fiber is mill or processing scrap that has been captured during a production process (e.g., papermaking, envelope production, printing) and has never been part of a finished product.

Many pre-consumer wastes have been recycled for decades. Because this was part of their normal production, manufacturers did not claim credit for recycling these wastes. But recently, as demand for "recycled content" has grown, many producers have claimed pre-consumer waste as recycled fiber, and have marketed "recycled" products that represent no change from established manufacturing practices. These claims have caused widespread consumer confusion, and in some cases a backlash against firms and industries marketing recycled products. Many states, including New Hampshire, have enacted legislation to manage the use of terms related to recycling. At the national level, the U.S. Environmental Protection Agency and Federal Trade Commission have issued guidelines governing use of these terms.

As a result of these state and federal actions, confusion regarding the meaning of recycled content claims is diminishing. For most "recycled" papers, purchasers should be able to obtain accurate information on pre- and post-consumer recycled fiber content, and ascertain that the "recycled" products they purchase do in fact include fiber captured from post-consumer wastes.

Choices for Consumers and Businesses -- In the paper industry (like most consumer product industries) consumer demand drives the selection of products that manufacturers make available. If consumers demand papers with recycled content, manufacturers will produce these papers. Recycled content papers are currently available in almost all paper grades, from high quality writing, printing, and copying stock to file folders, tissues, and paper towels. Consumers can ask suppliers for specific information on the recycled content of papers they purchase (including pre- and post-consumer fiber), and insist on buying only papers with the maximum available recycled fiber content. (As part of a statewide "Buy Recycled Challenge," described below, the State is developing information on the availability of recycled papers in many paper grades. This information will be made available to businesses and individual consumers to guide their purchases of recycled papers.)

Consumers exercise only indirect control over the recycled fiber content of many papers they purchase -- for example, books, magazines, newspapers, catalogues, and other printed products. For many of these items, consumers can make their preferences known to manufacturers by writing to express their preference for recycled content papers, or by refraining from purchasing products that do not contain recycled fiber. Many of these paper products are also the subject of state and regional efforts to increase recycled content. A number of such initiatives are described below.

State and Regional Initiatives to Purchase Recycled Papers -- A number of government initiatives are currently stimulating recycled paper markets. New Hampshire's state government has been committed to purchasing recycled paper since 1989, and by mid-1993 about 20% of the State's paper purchases included recycled content. Under a 1993 law and executive order signed by Governor Merrill, all paper purchased by State agencies must include at least 10% post-consumer fiber, and 50% total recycled fiber content. The New Hampshire Senate has made a commitment to match these targets. In addition, in 1990 the State reached a voluntary agreement with New Hampshire's eight daily newspapers to purchase specified quantities of recycled newsprint, culminating with 40% recycled fiber content by the year 2000. In 1992, the newspapers' average recycled fiber content was over 11%, already exceeding their first established target. All of the Northeastern states have implemented similar agreements or equivalent legislation.

A new statewide initiative is a public/private "Buy Recycled Challenge." Inaugurated by Governor Merrill and organized by a task force from government, business, and the environmental community, this campaign will challenge businesses, government, and non-profit organizations to make and report their purchases of recycled products. The campaign will emphasize paper products, but include a wide array of other recyclables as well. An important part of the campaign will be information on the availability and performance of recycled products which will be provided to campaign participants (and made available to the general public). New Hampshire's "Buy Recycled Challenge" is similar to a nationwide campaign targeting very large firms that has been orchestrated by the National Recycling Coalition, and to comparable campaigns that are being organized in many other states.

Regional recycling organizations have also been active in stimulating recycled paper markets. For example, the Northeast Recycling Council (NERC), which represents state recycling agencies in the ten northeastern states, has established an agreement with the Yellow Page Publishers Association to increase the use of recycled fiber (and achieve other source reduction and recycling goals) in telephone and other directories, and an agreement with the Direct Marketing Association to increase the use of recycled papers in catalogues and other direct mail advertising.

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RECYCLING GLASS

Glass in Solid Waste

Weight and Volume -- Thirteen million tons of glass were discarded in the U.S. in 1990 -- about 6 percent by weight of Municipal Solid Waste (MSW), and a somewhat smaller percentage of MSW volume. Containers account for 90% of all glass in MSW; durable goods (e.g., appliances) account for most of the remaining 10%. Nationally, over 80% of all glass discards are derived from residential sources, and less than 20% from commercial and industrial establishments. Locally, however, the proportion of commercially derived glass can be much higher. For example, New Hampshire's hospitality industry and recreational areas are the source of large quantities of discarded glass.

Of the 41 billion glass containers manufactured annually in the U.S., about 33% are food containers, 31% are beer bottles, 9% are wine and liquor bottles, and 22% are bottles for other beverages. The remaining 5% are containers for cosmetics, pharmaceuticals, and other materials. By color, over 65% of U.S.-produced bottles are clear ("flint" in industry terminology), 25% are brown ("amber"), and less than 10% are shades of green or (very rarely) blue. It is estimated that 2-4 billion containers (primarily beer, wine, and liquor bottles) are imported into the U.S. each year; more than half of imported bottles are green.

Disposal -- Glass is chemically and biologically inert, and remains intact in landfills (and the natural environment) for thousands of years. Even when glass is completely crushed, its chemical nature remains unaltered. Glass melts upon incineration, and is captured for disposal in incinerator bottom ash. Glass does not contain toxic or hazardous constituents that pose concerns upon landfill or incinerator disposal.

Glass Recycling

Collection, Processing, and Storage -- Nationwide, the U.S. Environmental Protection Agency estimates that about 30% of glass containers are recycled. New Hampshire's estimated 1992 recycling rate was about 22 percent. Over 95% of New Hampshire's residents have access to glass recycling through curbside or dropoff programs.

Glass collected to be manufactured into new containers must be managed carefully, because purchasers' quality specifications are very tight. A tiny proportion of contaminants -- as little as one ceramic mug in a 20-ton container -- can disqualify an entire load from recycling markets. Serious contaminants include non-container glass (e.g., windows, drinking glasses, light bulbs), mixed color glass, ceramics, and metals. Automated systems to classify glass by color or chemical characteristics

do not exist, with the result that glass destined for container markets must be manually color-separated and checked for contaminants — a labor-intensive and expensive process.

On the other hand, because it is chemically inert, glass can be stored outdoors for long periods before it is marketed. Most municipal recycling programs store glass in outdoor bunkers (typically three-walled concrete bins) until they have sufficient volumes to ship. Because of long transport distances and relatively low prices, glass must be shipped in large quantities, normally 20 tons or more. Bottles cannot be crushed prior to shipping (except for incidental breakage), because of processors' concerns that they could not identify contaminants in crushed loads.

Manufacturing -- The highest value end use for recycled glass is remanufacture into new containers. Recycled crushed glass (or "cullet") can be melted directly in the furnaces in which container glass is produced, with large savings in energy compared to production from unprocessed raw materials. For this reason, all container manufacturers actively seek out sources of recycled cullet.

In addition to new containers, recycled glass can be used in many other products. Recycled containers can be used to manufacture fiberglass, glass wool insulation, and similar products; color separation is not critical for such applications. Finely ground glass can be used as an abrasive, or in filter media, reflectors, and reflective paints. Glass has been used as an aggregate in asphalt paving mixes ("glassphalt"), although cost and technical concerns continue to limit acceptance of this use. Mixed-color and contaminated glass can be used as aggregate in gravel mixes for construction applications (e.g., highway and sidewalk subgrades, storm drains).

Markets for Recycled Glass -- Approximately 75 furnaces provide the major market for recycled container glass in the U.S. For clear and brown glass, this market has been fairly stable for the past several years. Markets for green glass are weak, however. Over half of the green containers used in the U.S. are imported, so domestic furnace demand for recycled green glass is not strong compared to the quantities that are recycled. Developing new markets for green glass is a regional and national concern. Non-container markets for green and other glass also remain relatively undeveloped.

A number of new technologies may have a major impact on recycled glass markets in coming years. Among these are techniques that will allow the increased use of mixed color cullet in existing glass furnaces, and technologies that may allow clear glass bottles to be coated with dyes in a rainbow of colors — the coatings will burn off in a glass furnace, allowing containers of all colors to be recycled together.

New Hampshire faces a number of specific market challenges for recycled glass. For example, the state has no end-use glass markets (furnaces or other manufacturers), and the cost of long-distance transport to markets can be prohibitive. Finding alternative markets for recycled glass is a high priority for the state's recyclers. The State's Department of Transportation was the first in the nation to adopt a specification allowing the use of crushed glass as an aggregate in state highway projects, and has actively sought to procure glass for this use. Many New Hampshire communities are also pursuing this and other options to find local uses for recycled glass.

For More Information -- Additional information on recycling glass and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

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RECYCLING PLASTICS

Plastics in Solid Waste

Types of Plastics -- Hundreds of different plastics are used in consumer and industrial products in the United States, ranging from very common plastics that are produced and used by the millions of tons to very specialized formulations produced in lots of only a few dozen pounds. Nationwide, six plastics account for over seventy percent of all plastics sales. These are *low density polyethylene* ("LDPE," 17%), *polyvinyl chloride* ("PVC," 15%), *high density polyethylene* ("HDPE," 14%), *polypropylene* ("PP," 13%), *polystyrene* ("PS," 9%), and *polyethylene terephthalate* ("PET," 4%).

Weight and Volume -- Plastics account for about 8% by weight of Municipal Solid Waste (MSW). Because plastics are lighter than many other materials in MSW, they contribute a larger proportion of MSW volume -- approximately 20%. About 80% of plastics come from residential sources, and 20% from commercial and industrial sources. About 30% of plastics that are discarded are in durable products (appliances, furniture, etc.), about 25% are in nondurable products (plates and cups, trash bags, etc.), and about 45% are in containers and other packaging. The plastics that are most commonly recycled -- PET soda bottles and other containers, HDPE milk jugs, and other HDPE containers -- account for 6%, 5%, and 10%, respectively, of all plastics that are discarded (0.5%, 0.4%, and 0.8% by weight of all MSW).

Disposal -- The primary concern related to plastics disposal in landfills is the fact that they do not degrade. However, because landfills are designed to exclude the conditions required to biodegrade *all* materials (i.e., water and oxygen), degradation rates for all other landfilled commodities are also very slow. Plastics have a very high "heat content" (an expression of their value as fuel), approximately equivalent to the heat released by fuel oil, and two to four times greater than mixed MSW. Plastics also burn with very little ash, and so are a valued component of the fuel mix in waste-to-energy incinerators. Most environmental concerns associated with plastics combustion have been related to hydrochloric acid gas emissions from polyvinyl chloride; PVC accounts for only 2-5% of all plastics in MSW, however (most PVC discards are in construction and demolition waste). A more general concern is that plastics disposal represents a waste of a valuable, nonrenewable resource, because plastics are manufactured from oil and natural gas.

Plastic Recycling

Collection, Processing, and Storage -- The plastics most commonly collected for recycling are PET containers (primarily soda bottles), HDPE milk jugs, and rigid, mixed color HDPE containers (detergent bottles, etc.). In 1992, recycling of one or more plastics was available to over three-fourths of New Hampshire residents through curbside or dropoff recycling programs. Most other common

plastics (e.g., grocery bags, polystyrene foams, etc.) are also recyclable, but their very small volume in MSW (compared to other recyclable materials) generally excludes them from municipal recycling efforts.

The light weight and strength that make plastics a desirable packaging material can also make them problematical to recycle. For their weight, plastics consume a very large amount of space in curbside collection vehicles and curbside and dropoff storage facilities, and a large volume of plastics must be collected before they can be economically processed and marketed. Plastic containers must also be carefully sorted by resin type before they can be sold into recycling markets; this is a particular concern for PET bottles, which can be contaminated by only a small number of lookalike PVC containers.

Manufacturing -- Recycled plastics are typically chipped, washed, and heated to produce pellets or flakes that can be manufactured into secondary products. Some mixed plastic items can be separated by weight into their component resins, but in general plastics must be separated before they are input into a secondary manufacturing process. Technologies to automatically sort mixed plastics are still several years away from widespread use.

Items manufactured from recycled PET include carpet fiber, fiberfill insulation for jackets and sleeping bags, appliance casings and handles, and floor tiles; only a limited volume is currently recycled back into containers. Recycled HDPE is manufactured into items such as flower pots, pipes, toys, and pails and drums; the proportion recycled back into containers is small but growing. Mixed plastics can be recycled for relatively nondemanding applications such as "lumber" for docks, traffic stops, park benches, and similar items.

Markets for Recycled Plastics -- Historically, markets for recycled plastics have been subject to significant fluctuation. New Hampshire has essentially no local markets for recycled plastics; most plastics recycled in New Hampshire communities are marketed outside of New England. At present, prices for recycled plastics are depressed because of low prices for oil and natural gas and worldwide overcapacity for virgin plastics production (especially for HDPE); no significant increases in market prices are likely in the foreseeable future. Translucent HDPE (milk jugs) and carbonated beverage containers (PET) are the only plastics that have dependable markets; markets for mixed color HDPE, "custom" PET (i.e., containers other than soda bottles), and other plastics are extremely variable and subject to frequent changes in quality specifications.

For More Information -- Additional information on recycling plastics and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

The Resin Identification Code

The resin identification code was introduced in 1988 by the Society of the Plastics Industry (SPI; the largest plastics trade association) as a voluntary measure to aid in plastics identification for recycling. The code has since been made mandatory on rigid containers in 39 states, including New Hampshire. The code includes a number from 1 through 7 surrounded by chasing arrows, plus a resin acronym. Professional recyclers and the general public have encountered significant problems with the code, because most coded plastics are not recyclable in the majority of U.S. communities, and because the code is ambiguous (e.g., not all "2's" can be recycled together). In mid-1993, SPI and the National Recycling Coalition announced a collaborative effort to revise the code.

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RECYCLING ALUMINUM CONTAINERS

Aluminum in Solid Waste

Weight and Volume -- In 1990, approximately 1.9 million tons of aluminum packaging was discarded in Municipal Solid Waste (MSW); this was about 1% of all MSW generated in the U.S. Of this total, 85% were soft drink, beer, and food cans, and the remainder was foil and semi-rigid packaging. Over three-fourths of aluminum packaging in MSW comes from residential sources (the average American uses 364 aluminum cans and about 2.5 pounds of aluminum foil per year). Because aluminum is light in weight compared to most other materials in MSW, aluminum packaging makes up a slightly higher proportion of MSW volume, about 1.4%.

Disposal -- No demonstrable environmental concerns are associated with the disposal of aluminum packaging in landfills or incinerators. Aluminum is nondegradable, and can be identified in landfill excavations for decades or centuries. Aluminum is also noncombustible, and is found in the bottom ash of waste-to-energy incinerators, where it remains as an inert component upon disposal.

Aluminum Recycling

Collection, Processing, and Storage -- Aluminum containers are one of the most commonly recycled materials in MSW. Over 90% of New Hampshire residents can recycle aluminum containers in curbside or dropoff programs. Nationwide, it is estimated that over 60% of all aluminum cans are recycled; the estimated recycling rate in New Hampshire is much lower, however -- only 15-20%. In New Hampshire and elsewhere, aluminum containers are frequently collected in a mix with steel cans, from which they are later separated by magnets. Aluminum containers can be contaminated by dirt, moisture, glass, non-container aluminum, and other metals; these rarely interfere with recycling efforts, however. Aluminum containers are typically crushed and baled locally before they are shipped to markets for further processing.

Manufacturing -- Aluminum containers are completely recyclable. They can be processed back into new containers with only about five percent of the energy inputs required to produce virgin aluminum from bauxite ore; the facilities required to produce recycled aluminum are also simpler and much less expensive than those required to produce aluminum from ore. Because the fundamental economics are so favorable, recycled aluminum is actively sought out by aluminum manufacturers. The "typical" aluminum can currently contains over 50% recycled content.

Markets for Recycled Aluminum -- Although they are subject to the impacts of worldwide fluctuations in commodity prices, aluminum markets in New Hampshire and nationwide are consistently strong. Year-in and year-out, aluminum cans are one of the most valuable recyclables. In fact, although the total quantity of aluminum recycled at the local level is much less than many other commodities (e.g., newspaper, scrap metal), aluminum typically generates the most revenue for local recycling programs. New Hampshire does not have any manufacturers that consume recycled containers as an industrial input; New Hampshire's processors and brokers re-sell the aluminum containers they purchase locally in regional and national markets.

For More Information

Additional information on recycling aluminum containers and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

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RECYCLING STEEL CANS

Steel Cans in Solid Waste

Weight and Volume -- About 2.5 million tons of steel cans were used in the U.S. in 1990 -- about 35 billion cans, or about 140 cans per person. Steel cans account for about 1.3% of Municipal Solid Waste (MSW) by weight, and a slightly higher proportion (about 1.8%) of landfilled MSW volume. Over 90% of steel cans are used for food products, and most of the rest are used for other consumer products (paints, aerosol products, etc.). A very small proportion are used for beer and soft drinks. Individual consumers are the source of most of the steel cans generated in Municipal Solid Waste (MSW); less than 15% are found in commercial and industrial wastes.

The term "tin can" is short for from the more accurate "tinned can," which refers to a very thin layer of tin applied to protect food and beverage flavors and inhibit rusting. Only about 6 pounds of tin plating are used per ton of steel. An increasing proportion of steel cans are being produced with new technologies that eliminate the need for tinning.

Disposal -- Steel cans will degrade very slowly (by rusting) in the natural environment. In a landfill, however, steel cans are effectively inert, because landfills exclude the oxygen required for rusting to proceed. Steel cans are noncombustible, and pass through a waste-to-energy incinerator in bottom ash. Some waste-to-energy facilities use magnets to separate steel cans (and other ferrous metals) from incoming wastes or from ash prior to disposal; none of New Hampshire's three waste-to-energy incinerators practices metals separation, however.

Steel Can Recycling

Collection, Processing, and Storage -- Because they can be magnetically separated from other MSW constituents, steel cans are among the easiest commodities to recycle. Nationally, about 34 percent of all steel cans are currently recycled; in New Hampshire, the current recycling rate is estimated to be about 17 percent. Many recycling programs, both dropoff and curbside, collect mixed aluminum and steel cans, and use a simple magnetic conveyor to separate them during processing. Steel cans are also very forgiving of contaminants -- for example, labels and food residues burn off during steelmaking, small quantities of aluminum (e.g., from steel/aluminum "bi-metal" cans) or non-container steel are readily accepted by steel furnaces, and the quantity of tin in steel containers is too small to cause any problems during steelmaking. (Steel cans cannot be mixed with scrap metal, however, because the tin coating causes air pollution concerns for steel mills that are not equipped to remove tin from emissions.) An additional advantage of collecting a mixture of steel and aluminum cans is that it tends to discourage the theft of aluminum cans -- a problem that has plagued many curbside and dropoff recycling programs.

Processing cans for markets is similarly easy. Some steel markets will accept mixed steel and aluminum cans, and most will accept steel cans either intact, flattened, or baled; arrangements vary with individual processors and the processing capabilities of specific municipalities. Potential concerns for local recycling programs are the handling of aerosol containers (because they may still contain compressed gases) and paint cans (a concern if any liquid residues remain), although paint cans are typically recycled with scrap metal, and not with steel food containers.

Manufacturing -- Steel scrap has been used in steelmaking for as long as the steel industry has existed. Steel cans can be melted directly in a steel furnace, or detinned (to recover higher value tin for resale to tin-using industries) prior to steelmaking. Basic-oxygen furnaces (the majority of U.S. steelmaking capacity) can use up to 20-30% scrap steel inputs; electric arc furnaces (a newer steelmaking technology) can operate with 100% scrap. Iron and steel foundries can also use steel cans as raw material. There are few limitations on the range of steel products in which recycled steel cans can be used as inputs.

Markets for Recycled Steel Cans -- Most New Hampshire municipalities market their steel cans to an established network of dealers in this and adjacent states. These dealers consolidate shipments from many municipalities (plus commercial/industrial sources) into loads that they resell in regional markets. End-use markets and prices for steel cans are relatively stable. Prices for recycled steel cans (and other ferrous scrap metal) are unspectacular, and are subject to fluctuations in national and international commodity markets. However, for most communities, prices for tin cans and other steel scrap are more than sufficient to justify their relatively low collection and processing costs.

For More Information

Additional information on recycling steel cans and other materials in New Hampshire is available from:

Recycling Coordinator
NH Department of Environmental Services, Waste Management Division
6 Hazen Drive, Concord, NH 03301
603-271-2900

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SCRAP METAL MANAGEMENT

Scrap Metal in Solid Waste

Weight and Volume -- Scrap metal is a very heterogeneous waste stream, including articles as diverse as discarded appliances ("white goods"), toys, tire rims, storm doors and windows, lawn furniture, plumbing and electrical scrap, car parts, and many others. Scrap metal includes essentially all metals in solid waste other than steel and aluminum cans.

According to U.S. Environmental Protection Agency (EPA) estimates, about 11 million tons of scrap metal were discarded in the U.S. in 1990 -- or about 6% of all Municipal Solid Waste (MSW). Over 80% of discarded scrap consists of ferrous metals (iron and steel); lead (from lead-acid batteries) and aluminum constitute most of the rest. Many industries -- for example, foundries, equipment and appliance manufacturers, and metalworking shops -- generate large quantities of scrap metal, but these are nearly always stored on-site for sale to metal processors, and do not become part of MSW. Over 90% of the scrap metal that is defined as MSW is derived from residential sources.

Although shredded or baled scrap metal is very heavy for its volume, most discarded scrap is in bulky products that resist compression. For this reason, EPA estimates that scrap metal contributes somewhat more to MSW volume, about 9%, than it does to MSW weight.

Disposal -- Scrap metal itself is relatively inert, and degrades very slowly (if at all) in landfills. Ferrous metals will eventually rust, and most other metals will also chemically degrade in the natural environment, but landfills exclude the conditions (moisture and oxygen) required for these processes. Metals are noncombustible, and pass through waste-to-energy incinerators as a constituent of bottom ash. Some waste-to-energy facilities use magnets to separate ferrous metals from incoming wastes or from ash prior to disposal; none of New Hampshire's three waste-to-energy incinerators currently practices metals separation, however.

Scrap Metal Recycling

Collection, Processing, and Storage -- Scrap metal is the "oldest" of all recyclables; scrap has been collected by municipalities, scavengers, and junk dealers for many decades, and has been used in steelmaking for as long as steel has been produced. Nationwide, because of the large volumes of steel recovered from dismantled buildings, old automobiles, and other industrial sources in addition to MSW, more steel is recycled each year than all other recycled materials combined, and about 68% of all "new" steel produced is actually recycled metal. In New Hampshire, many municipalities have had scrap metal piles at local landfills for dozens of years. Currently, over 180 of New Hampshire's 234 municipalities (including at least 90% of the state's population) recycle scrap metal.

Most municipalities collect scrap metal either in large piles (directly on the ground, or on gravel or concrete pads) or in large containers for direct transport to a scrap dealer. Very few municipalities bale or otherwise process scrap metal on-site, although some dealers offer on-site baling services (using transportable balers). Scrap metal can be stored out-of-doors for long periods with no significant deterioration or loss of value, and many municipalities stockpile scrap metal for a year or more before moving it to a processor. One of the few restrictions on scrap metal collection is that "tin" cans must be excluded, because their tin coating causes air pollution concerns for steel mills that are not equipped to remove tin from emissions (see DES's related fact sheet on Recycling Steel Containers).

Scrap metal's per-ton value is highest if mixed scrap is sorted. For example, both ferrous metals and aluminum can be separated into higher- and lower-value fractions, and other nonferrous metals (e.g., brass, copper) are quite valuable if separated from mixed scrap. Sorting must be done by hand, however, and few municipalities are able to make the required investment in time and manpower. Most municipal scrap metal is sold to dealers as an unsorted waste. Many dealers, who process large volumes at dedicated facilities, sort incoming metals to realize the highest market prices they can.

Although scrap metal itself requires little or no processing, two components of household appliances are a potential environmental concern, and require special treatment. *Chlorofluorocarbons* (CFCs), which have been associated with stratospheric ozone depletion, are used as a coolant in most refrigerators and room air conditioners. Under federal law, CFCs must be removed from these appliances before they are disposed of. Many scrap dealers have equipped themselves to remove CFCs from appliances, and now offer this service to municipalities (generally removing CFCs on-site at the municipal landfill or transfer station). In addition, electric transformers in some older appliances (air conditioners, dryers, fluorescent lights, and others) contain *polychlorinated biphenyls* (PCBs), which are carcinogens. These transformers should be removed before the appliances are processed for sale in scrap metal markets. Because transformers may be hard to reach, and transformers that contain PCBs can be difficult to identify, it can be problematical both for municipalities and metal dealers who process old appliances to assure that all PCB-containing transformers are removed.

Manufacturing -- Scrap metal has been used in metal manufacturing for as long as metalworking technologies have existed. For example, scrap steel can be melted directly in steel furnaces; basic-oxygen furnaces (the majority of U.S. steelmaking capacity) can use up to 20-30% scrap steel inputs, and electric arc furnaces (a newer steelmaking technology) can operate with 100% scrap. Foundries for iron and steel, aluminum, brass, and other metals also routinely use scrap as a raw material. There are few limitations on the range of metal products in which recycled scrap can be used as an input.

Markets for Scrap Metal -- Most New Hampshire municipalities market their scrap metal to an established network of dealers in this and adjacent states. These dealers consolidate shipments from many municipalities (plus commercial/industrial sources) into loads that they resell in regional markets. Dealers generally sort scrap by material and grade to realize the highest prices they can, and stockpile loads to sell them when prices peak. Some municipalities also sort and stockpile materials to maximize their market value, but the resources and market information required to do this are beyond the reach of most New Hampshire communities.

Markets and prices for ferrous and other scrap metals are relatively stable. Prices are subject to fluctuations in national and international commodity markets -- for example, Russian mills (which once produced almost entirely for domestic consumption) have recently sold large volumes of aluminum in international markets, driving down prices worldwide, and reducing the value of scrap metal piles at New Hampshire's transfer stations.

ENVIRONMENTAL Fact Sheet



NHDES Technical Bulletin # WMD-1994-18

SCRAP TIRE MANAGEMENT

•Background

Scrap tires can create problems if improperly managed. Large stockpiles of scrap tires present a significant fire threat, and trapped water provides breeding sites for mosquitoes which can transmit disease. Landfilled tires consume valuable landfill capacity and may result in an unstable base for cap construction and maintenance since air pockets in the tires can cause them to rise to the surface of the landfill.

Through Part Env-Wm 2607 of the New Hampshire Solid Waste Rules (recodified July 1, 1991), the Department of Environmental Services provides specific regulations regarding the manner in which scrap tires may be stored, disposed and transported. A permit from the Department may be required for the activities listed below.

•Management of Scrap Tires at Landfills

At a landfill, management of scrap tires refers to the temporary stockpiling of the tires, followed by shredding and disposal by landfilling. Key requirements for stockpiling scrap tires include: securing all storage sites against entry; limiting the size of tire piles; and providing fire prevention through separation of tire piles and by providing on-site fire prevention equipment and water supply. Operators must also provide berms to contain liquid releases from fire.

When scrap tires are landfilled, the tires must be cut, shredded or otherwise processed to reduce subsurface movement. The Department of Environmental Services discourages landfilling of scrap tires. The immediate costs may be minimal, but the long term costs of landfill closure and finding alternative disposal methods when the landfill is closed would, in most instances, prove to be disadvantageous.

•Options for Off-Site Management of Scrap Tires

The New Hampshire Legislature has designated landfilling to be the least preferred option for solid waste disposal. Relative to scrap tires, reuse, recycling, and incineration with resource recovery are each preferable to landfilling. Reuse includes tire recapping. Recycling tires is any process which reclaims the material for use in producing a marketable secondary product, for example, the manufacturing of rubber mats or footwear from scrap tires.

Producing power using tires as the energy source is an important market for scrap tire disposal. A pound of rubber contains 15,000 BTU's; a pound of coal contains 10,000 BTU's; and a pound of wood has less than 4,000 BTU's. At properly equipped and permitted incineration facilities, scrap tire chips can be burned in place of wood chips, providing a dual environmental benefit (tire disposal and preserving natural resources).

As with any material, an available market is the key to making the process work. There are established markets to recycle tires and established energy recovery markets. A comprehensive market listing is attached.

•Transportation

Tires must be transported in such a manner as to prevent pieces or whole tires from blowing or falling onto the roadways.

•Funding

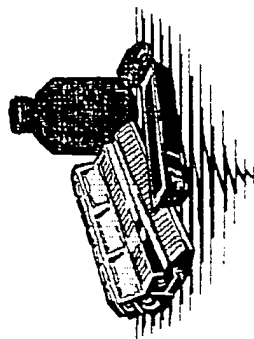
Towns are authorized under RSA 261:153, V to collect an additional fee at the time of motor vehicle registration to offset the cost of disposing of automobile wastes (scrap tires, used oil, and motor vehicle batteries) at municipally owned solid waste facilities. (Reference DES Fact Sheet 1990-12, "Vehicle Registration Fees for Recycling"). Towns may use the revenue from this fee for off-site scrap tire management.

For more information on scrap tire management, contact:

Department of Environmental Services
Waste Management Division
6 Hazen Drive, Concord, NH 03301-6509
(603)271-2935 (permit applications)
(603)271-5713 (other issues)



TONER CARTRIDGE RECYCLING



Each year, tens of millions of used toner cartridges are needlessly discarded into landfills, wasting valuable resources and adding potential hazards to our environment. Toner cartridge remanufacturing (recycling) can save your office time and money, as well as to help reduce the impact on NH's diminishing landfill capacity. Whether or not you choose to use remanufactured cartridges, you can help to protect the environment by recycling them.

What Is Toner Cartridge Remanufacturing?

Cartridge remanufacturing involves completely rebuilding previously used toner cartridges to like-new condition and ensuring they perform like originals. During this process toner residue is removed from the hopper and key parts (such as the corona wire, wiper blade, gears, photo sensitive drum, etc.) are inspected and replaced if necessary. The cartridge is then refilled with new toner which meets or exceeds quality specifications set by the equipment manufacturers and prepared for shipment to be used again. Parts that are removed during remanufacturing are rebuilt and reused in the manufacture of new cartridges or are recycled into new products. Excess toner is collected and burned to generate electricity. A properly remanufactured cartridge meets or exceeds generally accepted quality and performance industry standards of a newly manufactured cartridge, including copy density and yield.

How Are Printer Ribbons Remanufactured?

Printer ribbons (computers, calculators, typewriters, etc.) are commonly remanufactured in one of two ways. One method involves reinking a used ribbon with new ink and returning it for reuse in its original case. Most ribbons can be "re-inked" several times before they become too worn to continue this process. Once a ribbon reaches this point, the second method is employed. This involves "reloading" a brand new ribbon into the existing previously used plastic case. Some remanufacturers prefer to employ the second method.

Remanufacturing Toner Cartridges:

- **Saves you \$\$\$** - remanufactured toner or ink cartridges and printer ribbons cost up to 50% less than new cartridges and printer ribbons without sacrificing quality.
- **Saves you time and hassles** - most remanufacturing companies offer customers a delivery service and/or a convenient postage paid mail-back program - either way, cartridges are returned in their original packaging making the process very simple, saving you valuable time.
- **Reduces impact on our environment** - The plastic components of toner cartridges and printer ribbons do not decompose in landfills and the excess toner and ink contained within them may add unnecessary toxins to our environment. Remanufacturing greatly increases the life span of every used cartridge, saves valuable landfill space, and reduces the demand of natural resources needed to produce new cartridges.

With new advanced technology, most toner cartridges can now be remanufactured, including those used in laser printers, photocopiers, fax machines, and inkjet cartridges, as well as printer ribbons (computer, calculator, cash register, etc.). Some remanufacturing companies specialize in certain brands or models of cartridges while others service a wide spectrum.

April, 1996

Continued Inside

What about My Warranty and Service Agreements?

Whether you lease, rent, or own your equipment, no company can legally require you, without your approval, to use only the supplies manufactured by that company. Conditioning a warranty or service agreement on exclusive use of a manufacturer's supplies could violate State and Federal Antitrust and Fair Trade laws. Similarly, any good service technician will respect your choice of supplies if they want to retain your business.

How Do I Choose a Reputable Company?

Before choosing a vendor, consider asking the following questions:

- What type of cartridges do you accept for remanufacturing?
- Do you guarantee the remanufactured cartridge and under what conditions?
- What process do you use in remanufacturing toner cartridges?
- What is the return process, how does it work and what is the turn around time?
- Be sure to ask if there is a rebate for your cartridges. Some companies build the rebate into your next purchase, while others pay rebates outright or donate rebates to charity, and for some cartridges there is no value.
- What, if any, additional services do you provide?

Like many other industries, cartridge remanufacturers vary widely in their technical and manufacturing know how. It is important to consider the process controls used by potential vendors before choosing one with which to work. Also, many offer additional services, such as assistance in developing a cartridge recycling program, providing printer maintenance or carrying extensive lines of office equipment and supplies which may offer you added convenience.

Be sure to go with a reputable company. Don't be afraid to ask for references. Find out what other companies the potential vendor(s) service in your area. Also, check with a parent company or an affiliate organization to determine if they might have an existing toner recycling contract in which your office could participate.

Still Have Doubts?

If you have considered all of the information and still have reservations about using remanufactured toner cartridges, you can still have your used cartridges recycled. Many companies offer a rebate (cash, credit or charitable donation) for certain cartridge models even if you don't purchase remanufactured cartridges from them. Some will sell brand new cartridges for your convenience when you turn in used ones for remanufacturing.

*Please contact the NH Buy Recycled Challenge
for more information on other types of recycling.*

Below is a list of companies interested in collecting your used toner or inkjet cartridges or printer ribbons.

Company Information	Type of Cartridge Remanufactured	Will Recycle without Purchase	Sells New Cartridges	Additional Services
American Imaging Technologies Corp. 184-A Rockingham Rd. • Londonderry, NH 03053 Contact: Jerry Ruocco, President Telephone: (603) 437-1115	Laser Printer Photocopier Fax Machine	Yes	Yes	<ul style="list-style-type: none">• Sells inkjet refill kits.• Sells new & refurbished laser printers.• Offers repair services.
Cartridge Dr. of New England 282 Paige Hill Rd. • Goffstown, NH 03045 Contact: Al Johnson, President Telephone: (603) 497-5030	Laser Printer Photocopier Fax Machine	Yes	No	
Cartridge Recycling Technologies, Inc. 2456 Lafayette Rd. • Portsmouth, NH 03801 Contact: Brett Destefano, Owner Tel: (800) 321-7590	Laser Printer Photocopier Fax Machine	Yes	Yes	
Cartridge Warehouse 162 Old Hedding Rd. • Epping, NH 03042	Laser Printer Photocopier	Yes	Yes	

162 Old Hedding Rd. • Epping, NH 03042
 Contact: Norman Head or Kevin Freeman, Owners
 Telephone: (603) 679-8690

Con -ation Supplies
 12 Ricker Ave. • Londonderry, NH 03053
 Contact: Larry Sanford, President
 Telephone: (800) 258-3526

Danka EBS
 411 Waverly Oaks Rd. • Walham, MA 02154
 Contact: Mike McShane, Sales Manager
 Telephone: (617) 894-6283

Laser Cartridge Services
 5 Cunningham Dr. • Derry, NH 03038-5707
 Contact: James Andrikidis, Owner
 Telephone: (603) 434-3416

Laser Perfect Products, Inc.
 5 First Ave. • Peabody, MA 01960
 Contact: Kristy LaCroix, Sales Representative
 Telephone: (800) 344-6137

Laser Two
 77R Terrace Hall Ave. • Burlington, MA 01803
 Contact: Bob Theriault
 Telephone: (800) 328-6637

Lewis Recycled Products
 34 Midnight Sun Dr. • Epping, NH 03042
 Contact: Bruce Lewis, Owner
 Telephone: (800) 730-8539

Northeast Copier & Fax Service
 344 Newton Drive • Nashua, NH 03063
 Contact: Steve Galuna, Owner
 Telephone: (603) 595-9070

PAGE AFTER PAGE
 1617 Southwood Dr. • Nashua, NH 03063
 Contact: Robert Cyr, Marketing Manager
 Telephone: (800) 441-0539

Print Recovery Concepts, Inc.
 Route 4 - RR 1, Box 89 • Alfred, ME 04002
 Contact: Bruce Cochran, General Manager
 Telephone: (207) 324-1515

1 Photocopiers Inkjet Printer Fax Machine				
Laser Print Fax Machine	No	Yes	• Sells inkjet refill kit • Sells office supplies.	
Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	• Sells inkjet refill kits. • Sells used laser printers & fax machines. • Services laser printers.	
Laser Printer Photocopier Fax Machine	Yes	Yes	• Sells equipment and office supplies. • Offers repair service on desk top copiers & laser printers.	
Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	• Sells inkjet refill kits. • Sells equipment & supplies. • Services laser printers.	
Laser Printer Photocopier Inkjet Printer	Yes	Yes	• Reloads/reinks printer ribbons. • Offers repair service.	
Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	• Reloads/reinks printer ribbons. • Sells inkjet refill kits.	
Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	• Sells inkjet refill kits. • Offers repair service. • Sells reconditioned photo- copiers and supplies.	
Laser Printer Inkjet Printer Fax Machine	Yes	Yes	• Sells inkjet refill kits. • Services laser printers. • Offers one hour toner and printer repair services.	
Laser Printer Inkjet Printer Fax Machine	Yes	No	• Reinks &/or reloads printer ribbons. • Offers repair services.	

Company Information	Type of Cartridge Remanufactured	Will Recycle without Purchase	Sells New Cartridges	Additional Services
QSIC 755 Mammoth Rd. • Manchester, NH 03104 Contact: Mike Segebarth, Owner Telephone: (603) 624-1882	HP 51626A HP 51629A HP 51633A HP 51604A Ink Jet Printers Only	Yes	No	<ul style="list-style-type: none"> Sells inkjet refill kits/stations. Direct/continuous inkfeed system for HP 51626A only.
Quality Re-Inking RFD 3, Box 599 • Claremont, NH 03743 Contact: Walter Gobin, Owner Telephone: 542-2811	Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits. Reloads printer ribbons. Repairs ribbons and cartridges free of charge.
Recycled Office Products, Inc. 27 Walnut St. • Peabody, MA 01960 Contact: John Welz, Marketing Director Telephone: (800) 814-1100	Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits. Reloads printer ribbons.
Reliable Technologies, Inc. 55 South Commercial St. • Manchester, NH 03101 Contact: Mike Lambert, Sales Manager Telephone: (800) 346-7890	Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits. Sells equipment & supplies. Offers preventive & repair services.
Ribbon Recyclers PO Box 870 • Williston, VT 05495-0870 Contact: Jim Young, Owner Telephone: (802) 660-8960	Laser Printer Photocopier Inkjet Printer Fax Machine	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits. Reinks &/or reloads printer ribbons. Sells equipment & supplies.
Sentinel Imaging 747 Portsmouth Ave. • Greenland, NH 03840 Contact: Kim Smith, Marketing Manager Telephone: (603) 427-1911	HP 51626A HP 51608A Inkjet Cartridges Only	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits.
TONER etc. 124 Heritage Ave. • Portsmouth, NH 03801 Contact: Sarah Scheffer, Marketing Manager Telephone: (800) 370-8663	Laser Printer Photocopier Inkjet Printer Fax Machines	Yes	Yes	<ul style="list-style-type: none"> Sells inkjet refill kits. Reloads printer ribbons. Sells equipment & supplies. Services laser printers.
Watson Office Services One Wakefield St., Suite 202 • Rochester, NH 03867 Contact: Gary Watson, Owner Telephone: (603) 332-5223	Laser Printer Photocopier	Yes	No	

The information contained in this bulletin is believed to be reliable and is not intended to be comprehensive or an endorsement of any of the companies listed. We welcome additions.

APPENDIX F

MANAGMENT OF OZONE-DEPLETING SUBSTANCES



22 MAY 1993

REPLY TO
ATTENTION OF:

CECW-OA

MEMORANDUM FOR COMMANDERS, MAJOR SUBORDINATE COMMANDS

SUBJECT: U.S. Army Corps of Engineers (USACE) Operated Facilities Environmental Compliance Guidance Letter No. 6, Managing Ozone-Depleting Substances (ODSs) at USACE Projects and Facilities

1. Purpose. This guidance letter provides interim guidance for managing ODSs at USACE projects and facilities until ER 200-2-3 Environmental Compliance and EP 200-2-3 Environmental Compliance are published.

2. Applicability. This guidance applies to all Headquarters, USACE elements, major subordinate commands (MSCs), district commands, engineering laboratories and field operating activities (FOA) having responsibilities for Civil Works funded activities, including floating plant. USACE research and development laboratories and other facilities that are wholly or substantially military funded but not located on military installations shall adapt the ozone-depleting substance guidance in "Strategic Guidance and Planning for Eliminating Ozone-Depleting Chemicals from U.S. Army Applications" [reference (b)], in coordination with CECW-OA. USACE facilities located on Army installations will comply with the installation commanders' ozone-depleting substance elimination program requirements.

3. References.

(a) Executive Order 12843, 21 April, 1993

(b) Strategic Guidance and Planning for Eliminating Ozone-Depleting Chemicals from U.S. Army Applications, U.S. Army Acquisition Pollution Prevention Support Office (AAPPSO), Verdonic, Daniel P. and Thomas A. Bush, October, 1995

(c) Clean Air Act Amendments, 42 U.S.C. § 7671 et seq.

(d) 40 C.F.R. Part 82 (Protection of Stratospheric Ozone)

4. Policy.

(a) It is the policy of USACE, in conformance with Executive Order (EO) 12843, to:

(i) implement cost-effective programs to minimize the

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Facilities

procurement of materials and substances that contribute to the
depletion of stratospheric ozone; and

(ii) give preference to the procurement of alternative
chemicals, products, and manufacturing processes that reduce
overall risks to human health and the environment by lessening
depletion of ozone in the upper atmosphere.

(b) In implementing this policy, procurement practices shall
conform to the general requirements of Title VI of the Clean Air
Act Amendments by:

(i) minimizing, where economically feasible, the pro-
curement of products containing, or manufactured with, Class I
substances in accordance with EPAs phaseout schedule and
maximizing the use of safe alternatives;

(ii) amending existing contracts to the extent permitted by
law and, where practical, to be consistent with the
phaseout schedules for Class I substances;

(iii) being aware of the phaseout schedule for Class II
substances (Clean Air Act Amendments, Section 605) in developing
procurement policies and in awarding contracts; and

(iv) implementing policies and practices that recognize the
increasingly limited availability of Class I substances as
production levels capped by the Montreal Protocol decline until
final phaseout. Such practices shall include, but not be limited
to:

o reducing emissions and recycling ozone-reducing
substances;

o ceasing the purchase of non-essential products
containing or manufactured with ozone-depleting substances; and

o requiring that new contracts provide that any
acquired products containing, or manufactured with, Class I or
Class II substances be labeled in accordance with section 611 of
the Clean Air Act Amendments.

(c) USACE projects and facilities shall establish, fund and
implement management programs to support this policy. MSC
commanders, district commanders and commanders/directors of
facilities outside the district structure shall develop internal
procedures to assure compliance with all aspects of this policy.

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Facilities

ODS Elimination Plans shall be prepared for all projects and facilities where USACE has operations and maintenance responsibility for facility needs, including government-owned, contractor-operated facilities. Production phase-out milestones are contained in the Clean Air Act Amendments and are listed in the Army Acquisition Pollution Prevention Support Office publication "Strategic Plan for Eliminating Ozone-Depleting Chemicals from U.S. Army Applications." See reference 3.(b).

5. Definitions.

(a) Ozone-Depleting Substances means the substances controlled internationally under the Montreal Protocol and nationally under Title VI of the Clean Air Act Amendments. This includes both Class I and Class II substances.

(b) Class I substance means any substance designated as Class I in the Federal Register notice of 30 July 1992 (see Appendix B), including chlorofluorocarbons, halons, carbon tetrachloride, and methyl chloroform and any other substance so designated by the Environmental Protection Agency (EPA) by regulation.

(c) Class II substance means any substance designated as Class II in the Federal Register notice of 30 July 1992 (see Appendix B), including hydrochlorofluorocarbons and any other substances so designated by EPA by regulation.

6. Program Requirements.

(a) Identify sources of ODSs and determine type and amount.

(b) Monitor regulated ODSs to comply with standards.

(c) Procure equipment that meets applicable standards.

(d) Cooperate with Federal, state, and local authorities in achieving ODS plan goals.

(e) Assure that all technicians who service appliances and industrial process refrigeration units containing ODSs are certified by an EPA approved program in accordance with 1990 Clean Air Act Amendments, Title VI, Section 602(a). See reference 3.(c).

(f) USACE organizations in GSA leased facilities and USACE users of GSA leased vehicles will support applicable GSA programs to eliminate ODS use in accordance with lease agreements.

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Facilities

(g) Annually, commanders/directors must document their ODS elimination requirements. Documentation must reflect total or "real" cost to the facility plus justification for continuing resources to accomplish projects aimed specifically at eliminating ODS applications.

7. Guidance.

(a) Executive Order 12843 established a policy of the Federal government to implement cost-effective programs to minimize procurement of materials and substances that contribute to depletion of stratospheric ozone and give preference to procurement of alternative chemicals, products and manufacturing processes that reduce overall risks to human health and the environment by lessening depletion of ozone in the upper atmosphere.

(b) The Army's objective is to end dependence on ODS use in equipment and processes so that the pending phaseout of Class I ODSs causes minimal impact on Army missions. Although the Class I phaseout applies to chemical production and import only, and does not apply to their use, EO 12843 and Army policy do. Class I Substances list can be found in 40 C.F.R. Part 82, Appendix A.

(c) The key to efficiently eliminating ODSs from USACE projects and facilities is developing and implementing comprehensive ODS elimination plans. Operational project managers or facility managers should develop and execute ODS elimination plans addressing applicable facilities and equipment. Advance planning for phaseout of ODSs will minimize impact on individual projects and facilities. The Appendix describes steps involved in ODS elimination planning.

8. Yearly Updates. Operational project managers and facility managers should update their ODS elimination plans in advance of each annual budget cycle to reflect projected costs, plus justification for necessary resources, and provide input to the budget process. ODS coordinators should prepare updated versions of the ODS elimination plan when yearly updates are made. The updated yearly plan should reflect both accomplishments made against planned goals and unfinished requirements for eliminating ODSs.

9. Resourcing ODS Elimination.

(a) There is no special funding for ODS elimination. ODS elimination requirements shall be included in the applicable

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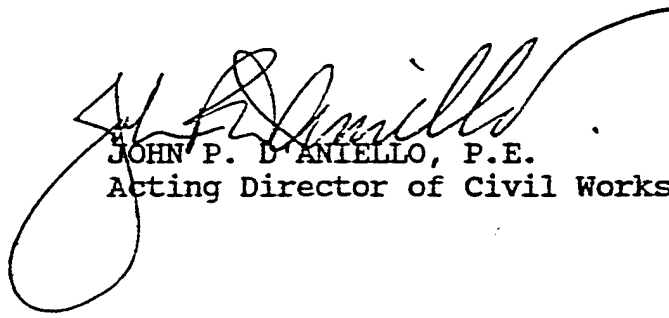
budgeting process. Using methodology described in this guidance, project and facility plans can be developed to totally eliminate the use of Class I ODSs.

(b) Funding these requirements could have varying degrees of impact on constrained budgets. To determine the extent of impact, MSCs should compile costs, by district, including laboratories and FOAs, to eliminate Class I ODSs. The estimated cost for each budget year, by projects and facilities, starting with the budget cycle for FY 1999 and continuing through FY 2003, should be provided. This information needs to be compiled and forwarded to CECW-OA by 30 September 1996.

(c) 40 C.F.R. Part 82, Appendix A (List of Ozone Depleting Chemicals)

(d) 48 C.F.R. Part 23 (Ozone Depleting Substances)

10. Dissemination. Please use your Environmental Compliance Coordinator network to give this Guidance Letter as wide a distribution as possible.



JOHN P. D'AMIELLO, P.E.
Acting Director of Civil Works

CECW-OA
SUBJECT: USACE Operated Facilities Environmental Compliance
Guidance Letter No. 6, Managing ODSs at USACE Projects and
Facilities

Appendixes:

- A. Steps in ODS Elimination Planning
- B. Controlled Substances

APPENDIX A
STEPS IN ODS ELIMINATION PLANNING

1. Step 1: Assign an ODS Elimination Coordinator

(a) It is recommended that MSC Commanders and District Commanders designate an ODS coordinator in the Operations element since most of the affected facilities and equipment are at operating projects. Laboratories and FOAs should also designate ODS coordinators. The intent is to provide senior leadership with a responsible individual to monitor execution of ODS elimination efforts throughout the division, district, laboratory, FOA, etc.

(b) ODS coordinators should be knowledgeable of USACE policies, and Federal, state and local regulations concerning ODSs, and be familiar with operations and maintenance of projects and facilities, especially those having refrigeration, air conditioning and fire suppression systems. ODS coordinators should be familiar with planning, programming and budgeting processes.

(c) It is further recommended that operational project managers and facility managers appoint an individual to oversee and coordinate ODS elimination efforts.

2. Step 2: Inventory ODS Equipment and Supplies

(a) The first task is to assemble an accurate inventory of all equipment which uses ODSs and an inventory of all ODS supplies on hand. The equipment inventory should include air conditioning, refrigeration, fire fighting systems, and all other ODS applications. These inventories will serve as the baseline for ODS elimination planning. The following information should be gathered as part of the equipment inventory process:

(i) Location of equipment - area, building, and room;

(ii) Ownership - determine if equipment is project, PRIP, logistics or personal property;

iii) Equipment type - manufacturer, model, and serial number of affected components;

(iv) Chemical used - identify the ODS used and amount of chemical contained in the system;

(v) Operating record - include the date of installation and operating conditions of the system which apply primarily to

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air conditioning and refrigeration units;

(vi) Maintenance record - include scheduled maintenance actions, emergency repairs, leaks, major overhauls and chemical recharges. The history of chemical requisition may be useful to supplement maintenance records; and

(vii) Future Plans - upcoming scheduled maintenance, building renovation, demolition plans or facility realignment.

(b) The information collected should include project and facility supplies and at least the following information:

(i) Chemical type - chemical name, new or recycled product (for quality control);

(ii) Storage location - building and ownership;

(iii) Allocation - specific-use dedicated chemical, and

(iv) Amount - total chemicals at that location, volume, weight, number of containers.

(c) Equipment and chemical stock inventories should be prepared in a format that can be updated over course of the ODS elimination program. Inventories will require periodic updating.

3. Step 3: Conservation Measures

(a) The next phase of ODS elimination planning is establishing maintenance processes for conserving and recovering ODS substances. Conservation measures, such as leak prevention, will be a main priority of on-going maintenance. By preventing leaks, the project or facility will have to procure fewer ODSs to replenish systems and will have a larger recoverable supply for reuse. For refrigeration and fire fighting systems, periodic checks using specialized chlorine detectors may be preferable. For air conditioning systems, especially those in detached mechanical rooms, fixed detectors may provide better protection against leaks. Fixed fire suppression systems can be checked by monitoring cylinder pressure gauges. If leakage occurs, systems must be repaired immediately. Without detection systems, leakage might progress to the point of reduced operating efficiency.

(b) Another conservation measure that can be implemented is the installation of high efficiency purge units on centrifugal air conditioning systems. The high efficiency purges prevent the venting of CFCs during normal operation. These purges are a low

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cost method to conserve refrigerant and may be considered for equipment not immediately scheduled for retrofit or replacement.

4. Step 4: ODS Recovery and Reuse

(a) After establishing accurate inventories, the operational Project Manager or facility manager should then do an analysis or evaluation of each ODS application. Based on these evaluations, decisions can be made regarding how to deal with each ODS being used. The following paragraphs describe principal options.

(b) Halons installed in power distribution systems, computer facilities and other electronic systems should be recovered. CFCs should also be recovered from project or facility systems when retrofit or replacement occurs. CFCs recovered from projects or facilities may be reused at the same project or facility. CFCs should also be recovered, reclaimed and reused if the project or facility determines the expense of recovery and reclaiming equipment to be worthwhile as an interim alternative to disposing used ODS solvents.

5. Step 5: Building the Elimination Plan

(a) With the information gathered from steps 1 through 4, Operational Project Managers or facility managers can build ODS elimination plans. The schedule for retrofitting or replacing equipment should be based on a priority assessment which is discussed in the following paragraphs.

(b) Retrofit refers to the modification of existing equipment so it can operate effectively with an alternative chemical. Recovery of the Class I ODS chemical and recharging the system with the replacement chemical is only part of the retrofit action. Frequently, additional system components should be replaced during retrofit actions. For example, fire fighting system nozzles and air conditioner lubricants should be compatible with the new chemicals used. The complexity and cost of these modifications should be evaluated when deciding between retrofit and replacement options.

(c) Replacement is the complete removal of an existing ODS dependent system and installation of a new system that uses an environmentally acceptable alternative chemical. In some cases, ODS containing equipment may no longer be needed and can be eliminated using approved disposal procedures. Only hermetically sealed ODS systems, such as water coolers and refrigerators, which require no ODS additions during maintenance, will be allowed to continue operating indefinitely and eventually be

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replaced through normal attrition and eliminated using approved disposal procedures.

(d) Decisions on whether to retrofit or replace hardware will be based on factors such as cost, condition, age, performance, and safety. Based on the information gathered during the inventory, the project or facility manager can determine which systems are in need of immediate attention, and which will be efficient and useful for a longer period. Those systems judged to be high priority for major maintenance should be retrofitted or replaced before those systems which are operating well. Listed below are some factors to consider when prioritizing and scheduling retrofits and replacements.

(i) High Priority System Indicators:

- o Frequent recharges, leaking components;
- o Obsolete, inefficient equipment;
- o Equipment near end of life in hours use or age;
- o Frequent maintenance and repair required; and
- o Building modernization scheduled.

(ii) Low priority system indicators:

- o Recent Installation;
- o Low maintenance, infrequent repair required;
- o CFC-13 refrigerant (no option available); and
- o System resistant to retrofit.

6. Step 6: Resourcing the Elimination Plan

See No. 9, Resourcing ODS Elimination, (a) and (b) of the Memorandum.

7. Step 7: Reporting Progress of the Elimination Plan

See No. 8, Yearly Updates, of the Memorandum.

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APPENDIX B

CONTROLLED SUBSTANCES

—Class I Controlled
Substances

Controlled substance	Ozone depletion weight
A. Group I	
CFCl ₃ —Trichlorofluoromethane (CFC-11)	1.0
CCl ₂ F ₂ —Dichlorodifluoromethane (CFC-12)	1.0
CCl ₃ F—CClF ₂ —Trichlorotrifluoroethane (CFC-113)	0.8
CF ₂ Cl—CCl ₂ —Dichlorotetrafluoroethane (CFC-114)	1.0
CClF ₂ —CF ₃ —(Mono) chloropentafluoroethane (CFC-115)	0.6
All isomers of the above chemicals	
B. Group II	
CF ₃ Br—Bromochlorodifluoromethane (halon 1211)	3.0
CF ₃ Br—Bromotrifluoromethane (halon 1301)	10.0
C ₂ F ₄ Br ₂ —Dibromotetrafluoroethane (halon 2402)	6.0

Controlled substance	Ozone depletion weight
All isomers of the above chemicals	
C. Group III	
CF ₃ Cl—Chlorotrifluoromethane (CFC-13)	1.0
C ₂ F ₅ Cl (CFC-111)	1.0
C ₂ F ₅ Cl ₂ (CFC-112)	1.0
C ₂ F ₅ Cl ₃ (CFC-211)	1.0
C ₂ F ₅ Cl ₄ (CFC-212)	1.0
C ₂ F ₅ Cl ₅ (CFC-213)	1.0
C ₂ F ₅ Cl ₆ (CFC-214)	1.0
C ₂ F ₅ Cl ₇ (CFC-215)	1.0
C ₂ F ₅ Cl ₈ (CFC-216)	1.0
C ₂ F ₅ Cl ₉ (CFC-217)	1.0
All isomers of the above chemicals	
D. Group IV	
CCl ₄ —Carbon Tetrachloride	1.1
E. Group V	
C ₂ H ₅ Cl—1,1,1-Trichloroethane (Methyl chloroform)	.1
All isomers of the above chemical, except for 1,1,2-trichloroethane.	

—Class II
Controlled Substances

CHFCl ₂ —Dichlorofluoromethane (HCFC-21)	(¹)
CHF ₂ Cl—Chlorodifluoromethane (HCFC-22)	0.05
CH ₂ FCI—Chlorofluoromethane (HCFC-31)	(¹)
C ₂ H ₅ FCI ₂ (HCFC-121)	(¹)
C ₂ H ₅ F ₂ Cl ₂ (HCFC-122)	(¹)
C ₂ H ₅ F ₃ Cl ₂ (HCFC-123)	0.02
C ₂ H ₅ F ₄ Cl ₂ (HCFC-124)	0.02
C ₂ H ₅ FCI ₃ (HCFC-131)	(¹)
C ₂ H ₅ F ₂ Cl ₃ (HCFC-132b)	(¹)
C ₂ H ₅ F ₃ Cl ₃ (HCFC-133a)	(¹)
C ₂ H ₅ FCI ₄ (HCFC-141b)	0.12
C ₂ H ₅ F ₂ Cl ₄ (HCFC-142b)	0.06
C ₂ H ₅ FCI ₅ (HCFC-221)	(¹)
C ₂ H ₅ F ₂ Cl ₆ (HCFC-222)	(¹)
C ₂ H ₅ F ₃ Cl ₆ (HCFC-223)	(¹)
C ₂ H ₅ F ₄ Cl ₆ (HCFC-224)	(¹)
C ₂ H ₅ F ₅ Cl ₆ (HCFC-225ca)	(¹)
C ₂ H ₅ F ₅ Cl ₆ (HCFC-225cb)	(¹)
C ₂ H ₅ F ₆ Cl ₆ (HCFC-226)	(¹)
C ₂ H ₅ FCI ₇ (HCFC-231)	(¹)
C ₂ H ₅ F ₂ Cl ₇ (HCFC-232)	(¹)
C ₂ H ₅ F ₃ Cl ₇ (HCFC-233)	(¹)
C ₂ H ₅ F ₄ Cl ₇ (HCFC-234)	(¹)
C ₂ H ₅ F ₅ Cl ₇ (HCFC-235)	(¹)
C ₂ H ₅ FCI ₈ (HCFC-241)	(¹)
C ₂ H ₅ F ₂ Cl ₈ (HCFC-242)	(¹)

C ₂ H ₅ F ₃ Cl ₇ (HCFC-243)	(¹)
C ₂ H ₅ F ₄ Cl ₇ (HCFC-244)	(¹)
C ₂ H ₅ FCI ₉ (HCFC-251)	(¹)
C ₂ H ₅ F ₂ Cl ₉ (HCFC-252)	(¹)
C ₂ H ₅ F ₃ Cl ₉ (HCFC-253)	(¹)
C ₂ H ₅ FCI ₁₀ (HCFC-261)	(¹)
C ₂ H ₅ F ₂ Cl ₁₀ (HCFC-262)	(¹)
C ₂ H ₅ FCI ₁₁ (HCFC-271)	(¹)
All isomers of the above chemicals	(¹)

¹ Reserved.